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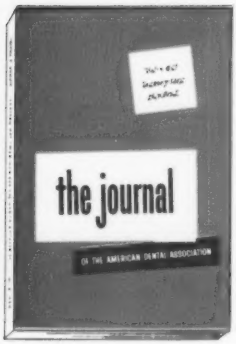

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Lon W. Morrey, D.D.S., Editor

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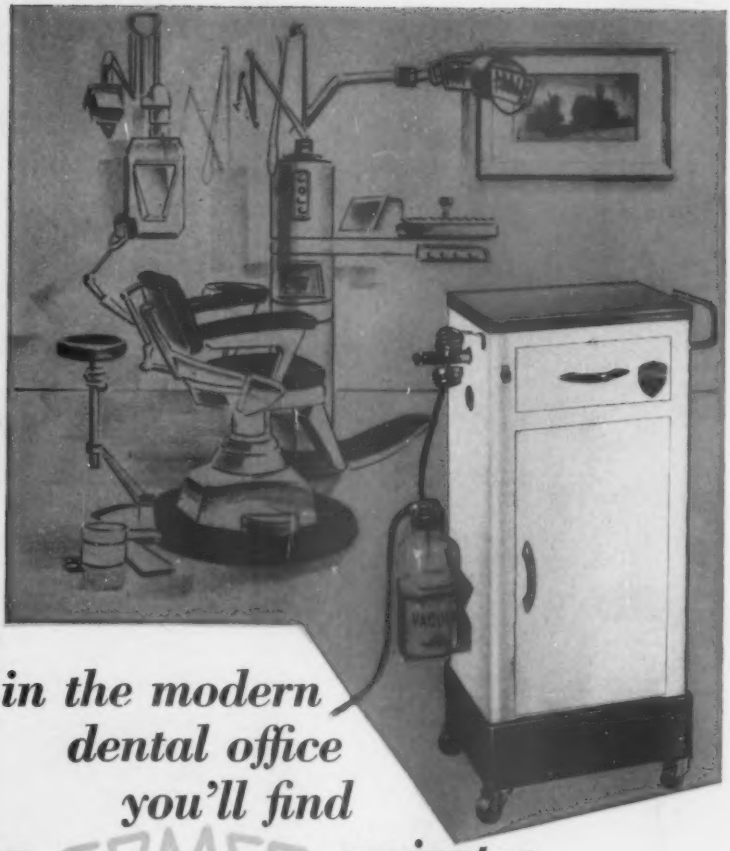

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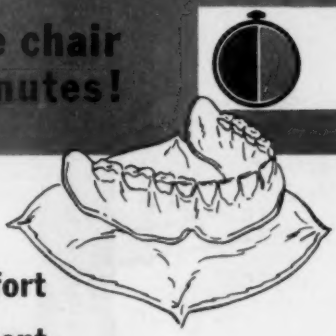

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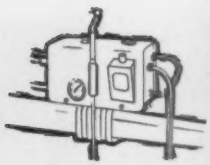

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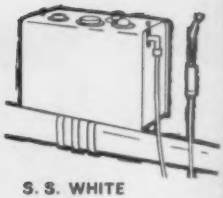

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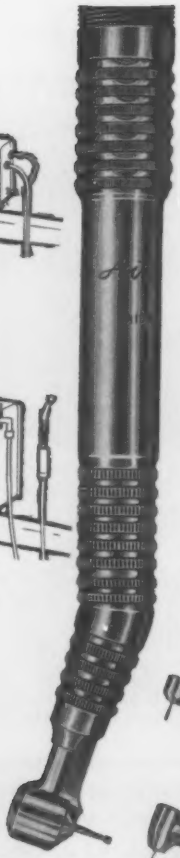

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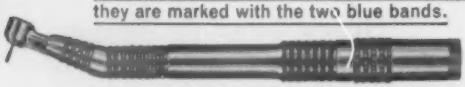

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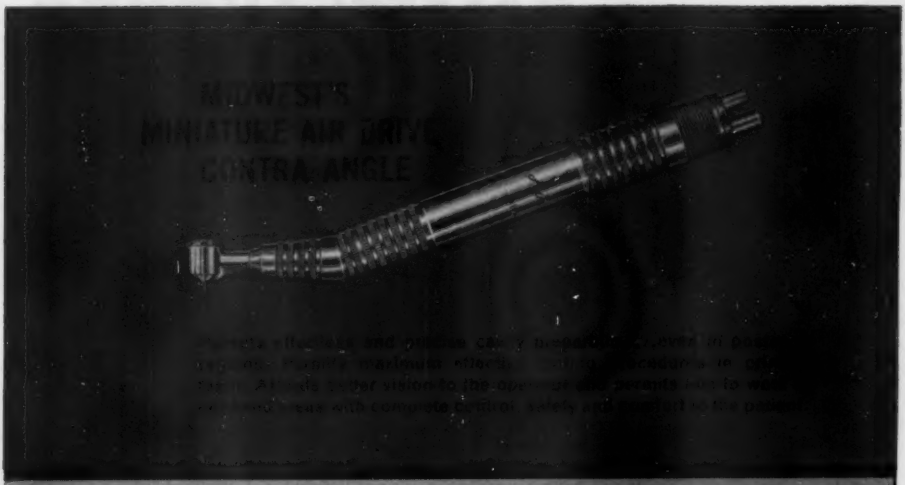

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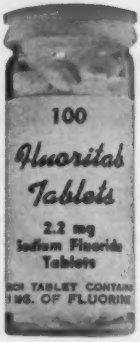

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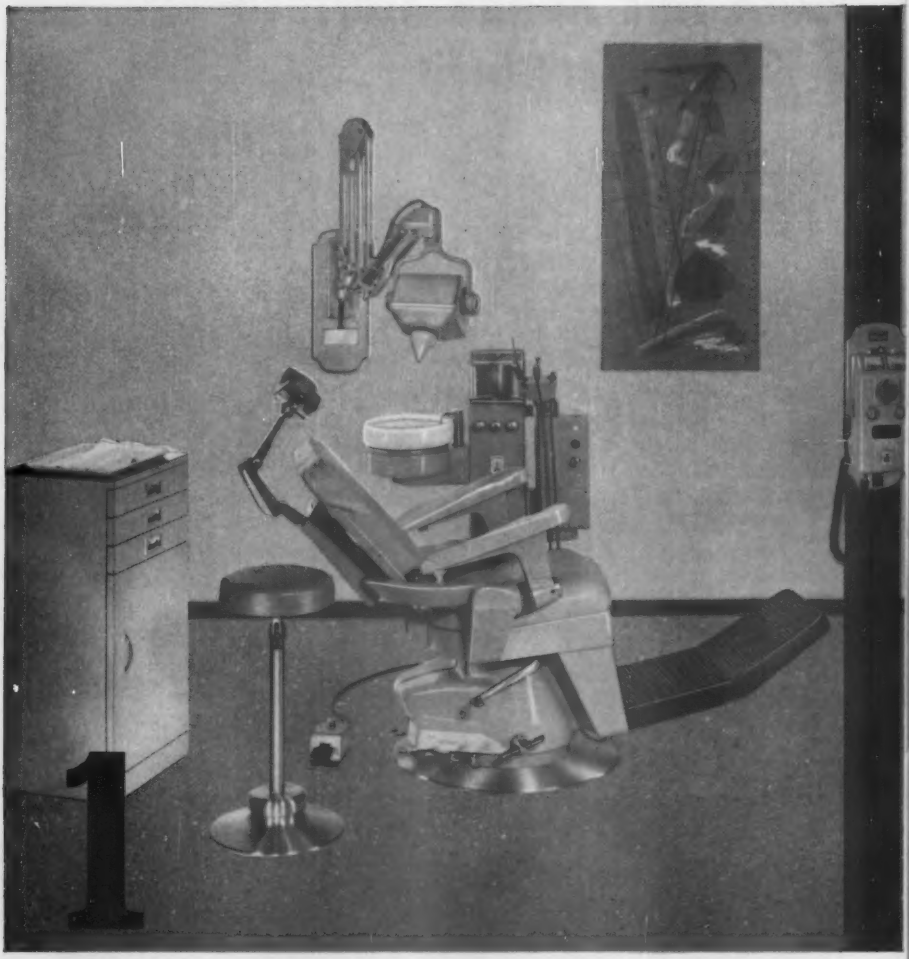

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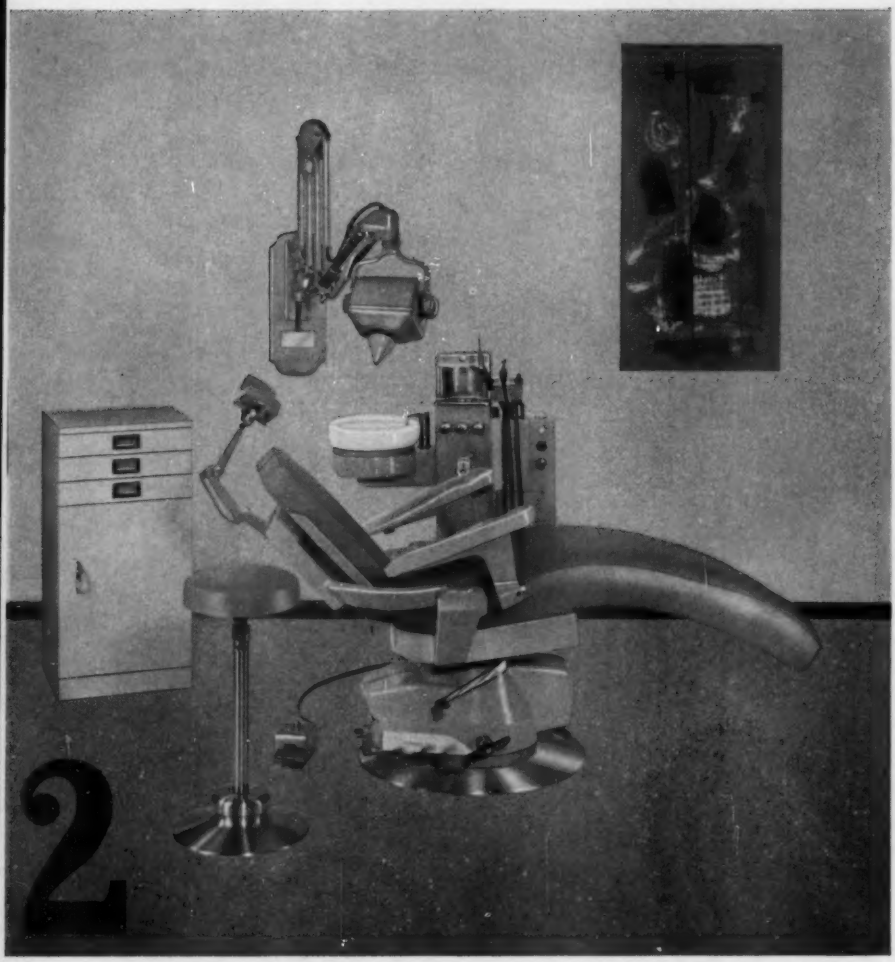

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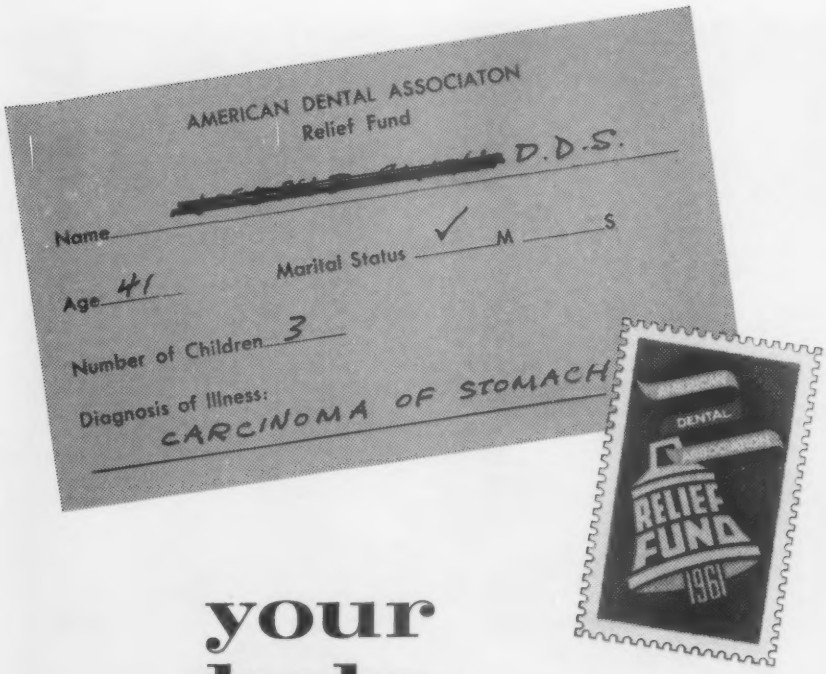

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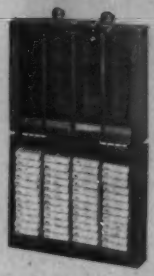

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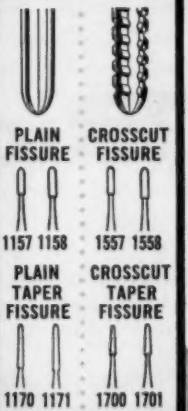

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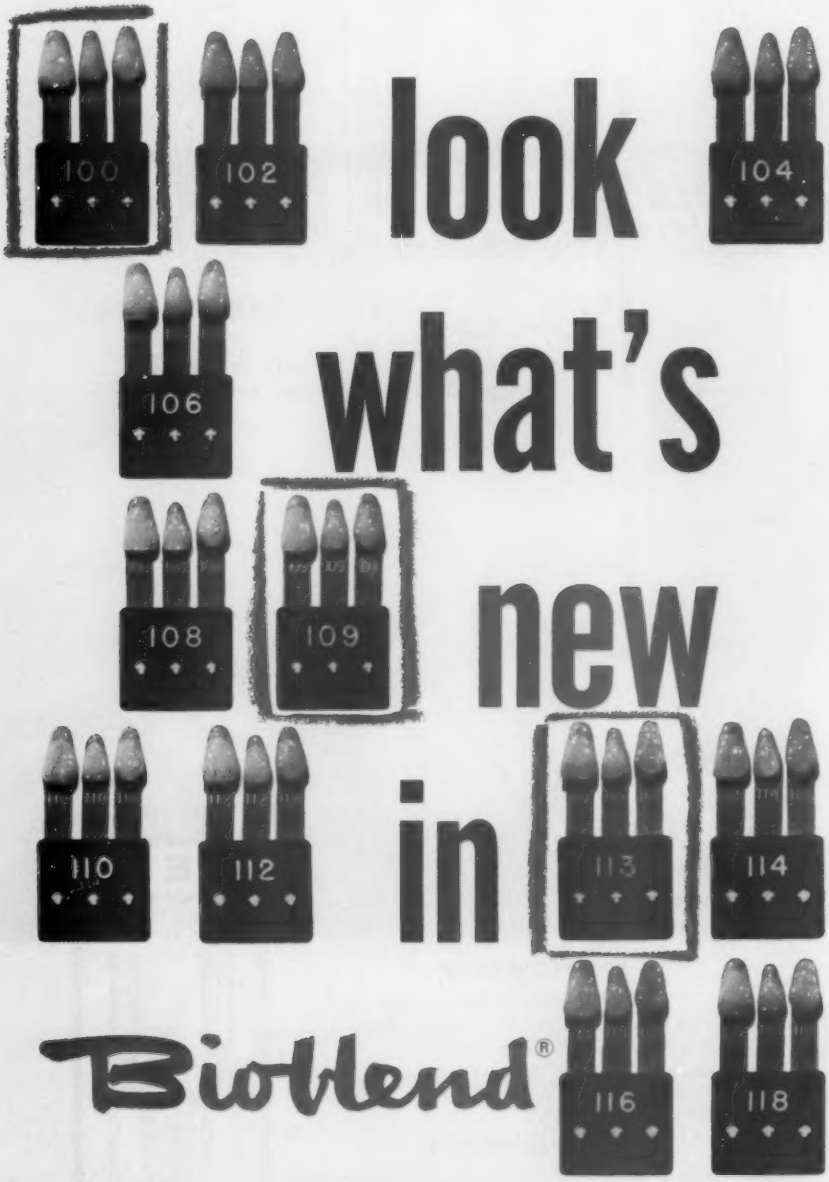

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Workshop conference on nutrition and preventive dentistry

Basil G. Bibby, D.M.D., Ph.D., Rochester, N. Y.*

For several years, teachers and investigators in the field of nutrition and preventive dentistry have felt the need of an opportunity to meet to evaluate the new information in their field and to discuss the problems encountered in teaching dental students and in interesting dentists in nutritional practices. When opportunity to organize a Conference for these purposes was made possible by financial support from the Nutrition Foundation, the National Vitamin Foundation and the American Chicle Company, the Eastman Dental Dispensary undertook organization of the Conference and provided a meeting place in its building.

As a result, most of the active investigators and teachers of dental nutrition and preventive dentistry met in Rochester, N. Y., on October 7 and 8, 1960 for a workshop conference. At this meeting, selected speakers were asked to present background information in chosen areas, and thereafter participants divided into groups for the consideration of related questions submitted by the participants.

Several of the papers presented at the Conference offered broad approaches to dental nutrition and will, therefore, be of interest and value to practicing dentists. Accordingly, several of these papers are published in the following pages, together with a brief summary of the conclusions of the groups which studied special problem areas relating to nutrition in dentistry.

*Director, Eastman Dental Dispensary.

PROBLEMS IN RELATIONSHIP OF DIET AND NUTRITION TO DENTAL HEALTH

James H. Shaw, Ph.D., Boston*

In a workshop conference it is the task of the speakers to present information which they believe to be well proved or almost axiomatic and to challenge the participants to discard information which is incorrect or unsupported, and to suggest how needed factual information can best be sought. Only thus can we avoid propagating for another generation the numerous impressions, shibboleths, fallacies, fads and half-truths to which we have all been exposed.

The outstanding problems involving diet and nutrition in dental health are first dental caries and then periodontal disease. Considerations of dental caries center around two specific areas: those dietary relationships which operate through the oral environment, and those systemic relationships of a strictly nutritional nature that operate primarily during the development of the tooth.

ORAL ENVIRONMENTAL INFLUENCES ON DENTAL CARIES

Several major factors are closely interrelated in the development of an oral environment that is conducive to dental caries. Unquestionably, dental caries is of microbial origin.[1] Although we have relatively little information from which we can identify the specific causative organisms, in all probability numerous species that have certain biochemical similarities are metabolically capable of initiating and sustaining the development of carious lesions. In addition, these microorganisms are readily transmissible in experimental populations of rodents.[2]

Dietary accumulations in the oral cavity are necessary for the normal growth and development of the microbial flora that cause carious lesions. These dietary residues that are retained on the tooth surfaces must contain carbohydrates if dental caries is to occur.[3] Hence, there has been a tendency in the dental profession to condemn all dietary carbohydrates and especially refined carbohydrate foods as a result of this observation. Obviously, complete prohibition of carbohydrate consumption is undesirable from the standpoint of palatability, it is impractical economically, and agriculturally impossible if we are to continue to nourish our present population adequately. Since carbohydrates cannot and should not be completely eliminated from the oral cavity, we need to have a great deal of information about what specific foods and under what circumstances they are the most cariogenic.[4] Therefore, we must look much more closely at the problem. An increasing body of information supports the observation that a reduction of food residues containing readily fermentable compounds results in reduced dental caries experience and that carbohydrate foods which are readily cleared from the oral cavity have relatively low cariogenic potentials.[5]

The outstanding problem in this area is to define the cariogenicity of specific foods and to determine whether there are any materials that can be used as food additives in order to reduce the caries attack rate of these specific foods. Much has been done in this area in the past decade, but we need a greatly increased rate of experimental investigation on this general subject.

Saliva is also one of the major components of the oral environment that may contribute toward caries-susceptibility or caries-resistance. It is obvious from experimental animal studies and from clinical observations that an adequate flow of

normal saliva in general contributes materially to the maintenance of normal teeth.[6] Any major mechanically or surgically induced reduction in flow inevitably results in a major increase in caries activity. However, we cannot be so specific as to define how this relationship operates in terms of quality, pH, buffering capacity, viscosity, or the composition with respect to either inorganic or organic moieties. Whether there is any relationship between current state of nutriture and the composition of the saliva is largely unknown. Two real problems in this area are to determine what are the specific relationships of (1) diet to saliva and (2) individual components in saliva to the maintenance of normal teeth.

POSTERUPTIVE INFLUENCE OF NUTRITION ON TEETH

In this whole complex of the oral environment, we must not forget the role that the tooth itself plays in maintenance against tooth decay. What are the posteruptive influences of diet and nutrition on the tooth itself? There are certain facts in this regard. The fluorine content of the surface enamel obviously increases with age, even in areas where the intake of fluorine is low.[7] The same increase occurs in high-fluorine areas. There is also an increase in fluorine content of the surface enamel after topical applications of fluoride solutions.[8] Another fact in this general area is that there is a significant decrease in the amount of tooth decay occurring in permanent teeth that were already erupted at the time when fluoridation of public water supplies began.[9] The latter observation has been amply demonstrated in Grand Rapids, Mich., where the reduction in dental caries experience among first permanent molars that were already erupted at the beginning of fluoridation was approximately 15 per cent. We know also from all the studies on the topical application of fluorides to tooth surfaces, whether it be a sodium or potassium or stannous fluoride solution, that definite reductions in tooth decay occur.

There is a clinical impression that the caries-susceptibility of a tooth decreases after the first year or two in the mouth. Whether this actually occurs or whether the observation is attributable to the early involvement of the most caries-susceptible surfaces cannot be answered specifically. There is also a laboratory impression that there is a period of maturation in animal teeth immediately after tooth eruption that can be interfered with by dietary procedures and by the absence of saliva. When the full extent of maturation does not occur, the teeth appear to be more caries-susceptible than otherwise. Obviously there are many problems in this area that need intense investigation. Indeed, it is a challenging and very hopeful area. Even on a posteruptive basis we need to be able to attain the best protective influence for the tooth itself by whatever manner of dietary or topical treatment procedures can be devised to increase the tooth's inherent ability to be maintained in the oral cavity. There seems to be little doubt that we have just begun to determine the full possibility within this general area. The addition of fairly high levels of soluble phosphates to the diet as a means of reducing the incidence of tooth decay may operate through this type of mechanism, or possibly directly through the saliva.

NUTRITIONAL INFLUENCES DURING DEVELOPMENT OF TEETH

Our next area concerns nutritional influences exerted during the development of teeth that would reduce their susceptibility to decay. In the 1920's and 1930's a number of studies reported that various severe nutritional deficiencies, such as of vitamins A, C and D, would result in major alterations in the histological structure of developing teeth.[10] More recently a variety of different nutrients has

been studied to determine the influence on the chemical composition of the teeth under conditions in which histological changes did not occur. Within the last few years, we have become cognizant of the fact that the size and shape of teeth can be altered by systemic disorders caused by nutritional imbalance during tooth development.

The last two decades have been exceedingly interesting ones insofar as studies on the relation of systemic circumstances during tooth development to the chemical composition of the tooth itself are concerned. The best demonstrated point unquestionably is the direct relationship between the level of fluorine ingested and the fluorine content of the tooth.[11] As a direct or indirect result of this increased fluorine level in enamel and dentin with an adequate level of fluorine ingestion, approximately a 60 per cent decrease in caries can be maintained throughout life. This level of benefit has been observed for teeth developed during adequate fluorine ingestion under widely varied racial, economic and climatic conditions.[12]

Numerous other factors loom on the scene about which we can be much less certain. What effect does the calcium: phosphorus ratio in the diet during tooth development have on the chemical composition? Are the variations in calcium: phosphorus ratio that are likely to occur in human dietaries sufficient to alter the carbonate content in the enamel or in the dentin, as is the case under severe conditions of imbalance in the rodent?[13] What are the relationships of increased dietary phosphate with normal calcium levels to the development of teeth? Are there any trace elements other than fluorine which may contribute, either beneficially or detrimentally, to the development of teeth?

It is well to remember in the discussion of the effect of trace elements during tooth development that this subject is largely unexplored because the great majority of the studies conducted in rodents have been after the teeth were largely formed and erupted into the oral cavity. Indeed, it is difficult to conduct these studies in rodents because the teeth are in such an advanced stage of development when the offspring are weaned. Therefore, scarcely any of the previous studies on trace elements can be directly correlated to clinical problems. The interesting epidemiological observations with respect to selenium and molybdenum suggest that there may be other minor nutrients of interest beyond those which have been explored. The fact that our foods come from wide and varied areas tends to minimize problems of inadequate or superabundant amounts of the trace elements in the human dietary. However, we should be alert to the possibility that trace elements other than fluorine may be supplied in insufficient amounts in foods.

In recent years, one of the really exciting contributions to knowledge regarding the development of teeth has been the demonstration that certain nutritional manipulations during tooth development in the rodent may alter the size and shape of the tooth, the time of its eruption, and its caries-susceptibility. The first demonstrations of this kind were those by Paynter and Grainger,[14] especially in connection with moderate imbalances of calcium and phosphorus. A later demonstration by Holloway, Shaw and Sweeney[15] in connection with protein deficiencies has extended the original observations.

A major hope in connection with the control of dental caries seems to lie in methods which can be applied to populations, such as the fluoridation of public water supplies. However, the enthusiastic teaching of nutrition in dental schools and active constructive dietary counseling in dental offices will be of no less importance. We have many clear examples now of the way in which diet and nutrition can influence the development of tooth decay. Much of this information was not known in such detail nor with such clarity

even a decade ago. Therefore, as teachers of nutrition today we have a great deal more reason to be enthusiastic about the role of good nutrition, of dietary planning and counseling, than ever before. Therefore, we must be well-informed in our subject; we must be prepared to discuss this subject intelligently and with enthusiasm during curriculum planning in order to demonstrate why nutrition is a valid and worthy subject to be taught to dental students, even though the time for it may have to be made available at the expense of teaching time in technical subjects.

NUTRITION AND PERIODONTAL DISEASE

Our knowledge with respect to periodontal disease, unfortunately, is much less well defined. Very little investigation has been conducted in this area in comparison with the vast amount of time and energy devoted to tooth decay. The number of papers concerned with experimental periodontal disease is less than 100. In reading many of the latter, it appears that of necessity the investigator has been sparring around in order to find places to attack the periodontal problem in laboratory animals. However, a few things are beginning to become apparent. In our own laboratory we have observed that the feeding of a soft, mushy diet to families of rice rats that are susceptible to periodontal disease will result in an adherence of food residues around the necks of the teeth. Within a relatively short time a breakdown of the soft tissues of the periodontium occurs.[16] This observation is particularly true when there are high amounts of readily fermentable carbohydrates in the diet. Obviously bacteria are again involved in this particular syndrome because the addition of relatively small amounts of penicillin or of Ilotycin to the diet caused major reductions in the soft tissue problem.

Obviously the area of periodontal disease is one where it is necessary to conduct a great deal of investigation in order to determine the exact relationships of diet and nutrition to this problem which is of such vital interest in oral health. Possibly one of the most important problems to attack in this area is determination of a really suitable experimental animal. There are reasons to believe that not one of the common species such as the mouse, the hamster and the rice rat which are used commonly in periodontal disease research is truly adequate for the problem under investigation. Possibly the ideal animal for these studies will prove to be one of the subhuman primates.

Practically nothing is known about the systemic relationship of nutrition to periodontal disease. This subject needs intensive investigation and probably has as high a priority as any other subject concerned with oral health.

SUMMARY

The factors controlling tooth decay may be divided into two general categories: those of dietary nature operating through the oral environment and those of nutritional nature operating through systemic pathways during tooth development. Two major factors in the oral environment that control the incidence of dental caries are the oral microorganisms and the carbohydrates of dietary origin that are cleared slowly from the oral cavity because of their ease of retention on tooth surfaces. Both of these factors may be altered by individually applied preventive measures which are of major importance and must not be underestimated by the individual dentist or physician as he counsels his patients. The third major factor is the saliva, the quantity and composition of which are unquestionably controlled by systemic influences which presently are little understood and largely beyond our control. The fourth factor in the oral environment in the complex determining caries-susceptibility is the tooth itself. To a large extent, its degree of proneness to dental caries has been deter-

mined prior to eruption. However, the increment of fluorine posteruptively in the outer surface of the enamel plus the significant reduction in tooth decay in erupted teeth as a result of fluoridation of public water supplies or of topical application of fluorides suggest that within modest limits the degree of caries proneness at the time of eruption into the oral cavity may be modified.

Apart from the hereditary influence, the major factors operating through systemic pathways to alter caries experience are nutritional in origin. Currently the most important and best understood of these concerns the ingestion of optimal amounts of fluorine during tooth development for incorporation into the hydroxyapatite lattice. Other nutritional mechanisms may be influential during development: appropriate ratios of calcium and phosphorus, increased levels of phosphorus and trace elements other than fluorine. All of these elements need much additional investigation before final assessment of their influence can be made.

At present a major hope for modifying the dental caries experience in a population appears to exist through public health procedures where tooth development is altered in such a way that caries-susceptibility is reduced. Parallel to this, the dentist should provide wise dietary counseling for his patients.

In the area of periodontal disease manifestations, our knowledge of dietary and nutritional relationships is a great deal less precise in both human populations and laboratory animals, largely for want of long-term investigations. From laboratory findings, there seems to be clear evidence that the retention of food debris in vulnerable areas results in an increased initiation of a syndrome that is similar to human periodontitis. Both decreased rate of oral clearance of experimental diets and increased carbohydrate content of these diets contribute to the rate of progression of this syndrome.

The role of nutritional factors in systemic pathways to modify this periodontal syndrome has yet to be evaluated. Although these relationships have yet to be elucidated and may prove to be largely negative, every patient under competent care for periodontal problems should receive the best nutritional advice as a worthy adjunct to skilled oral care.

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ORAL MANIFESTATIONS OF NUTRITIONAL DEFICIENCIES AS AN AID IN NUTRITIONAL DIAGNOSIS

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The term "nutritional deficiencies" is probably a misnomer, for what we are really interested in are the influences of nutritional inadequacies on the total metabolism of the body. Therefore, the terms "metabolic difficulties" or "metabolic problems" are preferable because they indicate that there is a total, over-all interrelated condition.

The mechanistic approach that has been in fashion for some years in the study of nutritional or metabolic problems has given rise to a type of thinking which is not broad enough to stimulate needed progress. There has been a tendency on the part of too many people to think in terms of single specific vitamins, or single specific nutrients, as giving rise to certain specific deficiency manifestations. This type of thinking is archaic, and it is time that we moved to the broader view that no one nutrient by itself can carry out a job without adequate supplies of all the other nutrients; that the total metabolic picture is actually the integration of all the nutrients into a normal functioning metabolic atmosphere. We should think of what the absence of these vitamins does to all the rest of the nutrient interrelationships in the body, how they upset the ecology, or balance, and thereby produce their results. For instance, some years ago we showed that the riboflavin requirements are related almost directly to the protein utilization; that in the presence of a negative nitrogen balance, that is, during the catabolic state when the body is excreting or metabolizing more protein than it takes in, it is virtually impossible for the body to retain riboflavin. One can give riboflavin in many times the so-called physiological or therapeutic dosage without altering the course of the so-called riboflavin deficiency syndromes. Just as soon as nitrogen equilibrium or positive nitrogen balance is achieved, then the amount of riboflavin required to relieve the manifestation is minuscule, and is in the order of the known physiological amounts of 1 or 2 mg. a day. This example offers very clear evidence of the association or interrelationship of one nutrient to the other.

When it comes to the oral manifestations of nutrient insufficiencies and the resultant metabolic aberrations, again we must think in terms of the total body rather than what we are specifically seeing in the local tissue in the mouth. Clinically, it is perfectly feasible—as a matter of fact, it is absolutely necessary—to use what we call indicator signs of the metabolic problems as diagnostic aids because they are easily and quickly seen on the surface of the body. However, we must never forget that these indicators are merely insignificant manifestations of the total metabolic aberration which is going on in every single cell in the body. The importance of the deficiency syndrome is not the crack in the corner of the mouth, which may give a little local discomfort. Its importance is in the interference with all of the cellular oxidative functions in the body resulting from the inadequate amount of a particular nutrient. The inadequacy, it should be noted, may result not only from deficient dietary intake, but also from the inability of the body to utilize the nutrient even if it is present in the diet in adequate amounts. Here again, we must think of the total metabolic picture rather than the specific dietary intake at any one time.

The indicator signs, which are so ob-

vious, and which the dentist will see in the mouth, are not specific. After all, tissues are limited in their ability to react to certain stimuli. Regardless of the stimulus, tissues can react in only one or two ways, so that the local manifestations of the absence or surplus of particular nutrients are a function of the tissue. That is why there are so few variations in the superficial manifestations of nutritional inadequacies. There are three major things that tissues can do when they react to an irritant or to a change in environment: they can change functionally, they can change anatomically, and they can change in color.

Functional changes are more frequently seen in other parts of the body than they are in the mouth, as, for instance, the loss of the knee jerk that one sees in beriberi where there has been a definite neuritis and the nerve loses its function temporarily. If this has not been allowed to exist for too long a period, it is completely reversible by the restoration of adequate nutrition. In the mouth, some of these functional changes show themselves as a burning tongue. This is a manifestation of a nerve irritation, and since the nerves in the mouth can only react in a few ways, they do so by creating a sensation of burning. The burning tongue is a very nonspecific thing. That it may be a manifestation of anything from an allergy to a nicotinic acid deficiency must be kept in mind.

Anatomic changes occur very slowly and reverse very slowly, in contrast to functional changes which may disappear rapidly. The administration of an adequate amount of thiamine and total nutrition to the beriberi patient can restore the knee jerk or the tendon reflexes within 24 or 36 hours. When anatomic changes have occurred, such as in pellagra and some of the other nutrient inadequacies, we have an entirely different problem; the epithelial cells of the body do not regenerate or replace themselves overnight. As a result, an anatomic manifestation of metabolic disturbance persists for weeks or even months after the basic inadequacy or insufficiency in the dietary intake has been corrected. The time factor with respect to the anatomic changes is different from that found with certain of the functional changes.

The color changes that are seen in tissue can be the result of several different factors. When we look at the color of the mucous membranes of the mouth, we are looking through the surface epithelial tissue to the underlying vascular bed, and the combination or complex of these two variations in light transmission and in color generation result in what we see. Now this color can be changed for several reasons. If the surface epithelium becomes keratinized or thickened or less translucent, then the color will appear paler, not because there has been any change in the vascular underlying bed, but merely because there has been a blockage in the transmission of the light or the color from the underlying structures. On the other hand, if there has been a denudation or exfoliation of the surface epithelial tissues, the color can appear deeper and redder, not because there has been any change in the vascular bed whatsoever, but merely because there has been a loss of the opacity of the surface which allows the underlying color to be more readily perceptible. Other reasons for these color changes then can be found in an increase or decrease in vascularity. Assuming that the surface epithelium remains constant, it will make the color appear redder, but if there is vasoconstriction or anemia the color will appear lighter.

Thus, it can be seen that there are four variations producing essentially the same results, but which are basically entirely different in their mechanism. Consequently, at the time one is looking at the mucous membranes, or any tissues, one should try to analyze which one of these factors is producing the change, because

it is the mechanism of the change rather than the visible change that is more indicative of the underlying condition. It is the failure to observe or to understand these basic facts which has led to so many disagreements among those who are interested in the diagnosis of metabolic disturbances resulting from nutritional inadequacies or overabundances.

No one single clinical indicator is of any significance by itself; it takes at least two or three different indicators, all pointing toward the same direction, to give one the assurance that one is dealing with a syndrome of a nutrient inadequacy. These manifestations are nonspecific. It is only by the epidemiological approach and the statistical analysis of the data and the associations with the dietary intake studies that one can come to a final conclusion. However, from the point of view of a medical practitioner or dentist in his day-to-day work, it seems obvious that if indicator signs are present, these should lead to a thorough nutritional investigation, and, on the other hand, if there are no indicator signs, then the practitioner can assume that the diagnostic problem is not due to nutritional inadequacy.

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SOCIAL AND EMOTIONAL FACTORS IN DIET CHANGES

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If human nature always functioned reasonably there would be no problem in applying new scientific knowledge about nutrition to our daily meals. However, it is only too well known that people have a stubborn way of insisting on eating food "they like" and not food that "is good for them." Recognizing and understanding this human element will be of help in making better use of the physiologists' discoveries in educating people towards more desirable food habits.

Even though this is old popular knowledge, no systematic studies were available when, at the beginning of World War II, our government wanted to prepare the population for possible wartime shortages and plan intelligently for postwar feeding of destitute countries. It charged the National Research Council, therefore, to study how mass feedings that were adequate and economical from a nutritional point of view could be planned so that they were palatable and acceptable to various population groups. Two committees were formed, one for the study of nutritional factors and another for the study of food habits. The report of this latter committee, published in 1943,[1] discusses the problem of changing food habits chiefly from the sociological and anthropological point of view, but includes also some clinical observations. In 1955 the New York Academy of Sciences arranged a symposium on "The Regulation of Hunger and Appetite" with greater emphasis on the physiological and medical problems.[2] I shall draw on the findings of these two reports and on my clinical experience which has been enriched by participating in the work of these research groups. My own work has dealt with a variety of metabolic conditions; those in which the self-selected food had led to the abnormality, as in obesity resulting from overeating, and

others in which the nature of the disease made dietary changes necessary, such as diabetes, celiac disease, allergy and epilepsy (at the time when the ketogenic diet was in use).

Social and emotional factors pervade eating habits to such an extent that they are taken for granted and are considered normal and natural. We become aware of them when faced with strange food customs; for example, when foreigners find delight in eating food that evokes in us the response of "inedible" or even "revolting." I am sure that everyone has made some observations along this line and thus is aware of the extent to which social factors with strong emotional overtones influence what we eat. A special aspect of the American society is the readiness to adopt new habits, usually as passing fads. Though eager to listen to the advice of the expert, sound educational information about nutrition often is drowned out by the lure of advertising, praising the very items the expert condemns as harmful.

I should like to illustrate this with a little anecdote about the effectiveness of advertising. Several years ago I visited my family in a rural district in California. When the time for the weekly shopping came, I went along to what I consider the most exciting place in these small towns; namely, the lavish supermarket. I invited my niece and nephew, aged two and four, to buy anything they wanted. I was amazed by the definitiveness and enthusiasm with which they chose a large variety of things, some quite remote from what one would consider childish taste, such as a certain brand of coffee or shaving cream. Later, when we inspected the odd collection, and it was a huge basketful, the parents were puzzled because there was scarcely an item they used in their household. The largest portion was made up of syrups, soft drinks and sugar-coated cereals. I defended myself against implied reproach; the children had chosen these things, and the little fellow had practically jumped out of his seat in the carriage when clamoring for something he had spotted and wanted. Finally we hit upon the clue—every product had been seen on TV and the children had chosen them on sight, from memory. Being economically-minded, the parents did not discard my purchases, but it was made very clear to the children that Aunt Hilde did not know better, that these things were not good for children and could be used only on very special occasions. A brief follow-up note: the supply lasted for more than a year and the children, now eight and ten years old, have good teeth with few cavities.

Unfortunately, many parents are not so sales resistant and secure in bringing up their children but are themselves gullible and influenced by the advertising slogans. Others are influenced by misguided psychological advice that a child's wishes and demands should never be frustrated. In such a climate, unhealthy eating habits may develop and become so deeply ingrained that they resist efforts at change. Eating habits have strong emotional overtones. This is related to the fact that from the earliest day of life the intake of food requires the intimate cooperation of the mother, or some other person. Thus eating is always an interpersonal experience charged with the emotional complexity of the mother's own attitude, the forces that impinge on her and the interaction between her and her child. The primitive relationship between the discomfort of hunger and its relief through food that is physiologically adequate becomes exceedingly complex through these modifying individual experiences. The widely different eating customs are thus learned, along with the many emotional reactions to the act of eating, and the way eating may be used or misused in the service of many non-nutritional, but psychologically determined, needs. Even though we speak of hunger and appetite in a general way, we do not know whether all people experience the same sensations. It is prob-

able that for each individual the physiologic and psychologic experiences may be somewhat different. In addition to hunger and appetite, the manifold psychological feelings are described as yearnings, craving, addiction, compulsion—or conversely, disinclination to eat is experienced as anorexia, aversion, disgust and loathing of food. These conditions are not always determined by psychological factors, they may also develop on a biological basis.[3]

It is against the background of such complex conditions that the nutritionist works when changes in the food intake become necessary, which may consist of giving up harmful habits or accepting unfamiliar foods that had been missing in the diet.

CLINICAL OBSERVATIONS

I shall discuss briefly some of my clinical observations on how different individuals react when confronted with the problem of giving up customary habits, not because they have spontaneously changed their taste and appetites but because it was prescribed in the interest of better health.

My first observations were made on fat children whose huge food intake was found to be closely related to severe emotional difficulties in their development.[4] Food for them serves to relieve tension, gives an immediate gratification and a semblance of pleasure and satisfaction. Food is also overvalued because to the mother of such a child, herself crippled in her emotional maturation, it represents a way of expressing love and devotion. When eating plays such an important role in the psychic economy, changes in the dietary patterns should not be planned without attention to the psychological needs. Neglect of the emotional aspects may result in severe psychic reactions when a reducing diet is enforced.[5] The same was observed by Stunkard[6] in obese adult patients.

Fortunately, patients with other diseases requiring dietary changes do not react in such a uniformly negativistic way. I shall limit my remarks to observations on diabetic children and their families, some of whom have been followed for more than 20 years.[7-9] None of them found the restriction in the freedom of food choice easy, but they reacted in different ways, depending on the emotional health and stability of the family. Roughly three patterns could be recognized. The first and most desirable way may be described as one of rational acceptance of the new situation with consistent, though not rigid, cooperation. There may be some confusion in the beginning which does not interfere with the readiness to learn. Not infrequently the whole family adjusts their eating habits to make the diet of the patient not too difficult. In these families other situations, too, are handled in a spirit of mutuality and without resentment for the member who requires special consideration. These patients whose families had been rated as stable and congenial and capable of handling the difficulties of diabetes did well in the long run, even though some had been diagnosed as severe in the initial evaluation. They had few hospital admissions, except for re-standardization, and also did well in their social development. Loyalty to the doctor or the clinic appeared to be an important factor in making this good cooperation possible.

The second group is characterized by excessive cooperation. The different tasks are not carried out as reasonable parts of a regimen, but in an overperfectionistic way. There is rigid adherence to the diet with much anxiety about the slightest deviation. The diet and the other tasks are not seen in relation to their function but as magic that would bring about the cure by obedient attention to all rituals. Such patients may have difficulties in accepting changes as they become necessary with changes in the metabolic condition. Family relation-

ships are smooth but tense, usually with an anxious and over-rigid mother. Some of these patients who had been over-compliant during childhood, rebelled during adolescence and in their struggle for independence would go off the regimen entirely, making adequate diabetic control exceedingly difficult.

The third group had difficulties from the start in accepting the disease and the necessary restrictions, making adequate control of the diabetes impossible. In all these cases symptoms of emotional disorder and severe family discord had preceded the illness. These children were in a constant emotional turmoil, depressed or defiant, suffering repeatedly from "inexplainable" acidosis and were constantly in and out of the hospital. Without consistent psychotherapy this sad course continued; one young man had been in the hospital 25 times by the time he was 25 years old. They had not only difficulties in controlling the diabetes but in making an adjustment to any aspect of living. Some became schizophrenic or developed some other serious mental illness.

NUTRITION AND DENTAL PROBLEMS

What is the relevance of these observations to the problems which confront the dentist? Most of all, the fact that attention to the existing eating habits is a necessary precondition for using nutrition in preventive dentistry. However well-founded our advice is, it is useless if the patient is not able to carry it out. The tendency in the past was to blame the "uncooperative" patient for his failure and to shrug him off as a nuisance.

The dentist sees a truer cross section of the population than a physician specializing in metabolic diseases, and even more than a psychiatrist. Most of his clients probably will behave like the diabetics whom I described as the first group capable of accepting changes as a job that needs to be done. Even with them emotional and social factors must be considered. In order to be well motivated, a patient needs to understand the reason for the changes, in terms of his age and education. Too much information may be frightening if it is misunderstood, and too little may make the sophisticated feel uneasy. Customary food habits and the daily routine of living should not be neglected. The extensive study report on changing food habits[1] contains much useful information on the effectiveness of educational programs about nutrition. Not only the attitude of the patient for whom the diet is prescribed but also that of the person whom Lewin[10] calls the "gatekeeper" whose ideology controls the food channels at various points must be considered. Usually it is the mother or housewife who is responsible for the food that comes to the table and whether it is presented in a neglected or tasty and attractive way. No dietary program can be successful if she resents it.

However, the dentist will also see "problem patients" who need to be approached in a much more individual way. Special attention should be paid to the rigid person who interprets everything in a perfectionistic way but becomes so anxious that he finally gives up and neglects his teeth entirely. They are apt to be overlooked because they are so cooperative at the beginning.

Finally, there is the group who is openly uncooperative and emotionally upset. I do not hesitate to say that a person, child or adult, who is truly unable to cope with a necessary dietary program, the importance of which has been explained to him, suffers from an emotional disturbance. In my own experience the problem is often quite severe. By recognizing this factor and giving due attention to the individual needs, the dentist's office may become, not only a place for preventive dentistry, but also for preventive psychiatry.

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CULTURAL, GEOGRAPHICAL AND TECHNOLOGICAL INFLUENCES ON DIET

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Emotional and social factors are important, but they are not the only factors which influence diet selection. What a human being eats is determined also by age, sex, geographical location, economic status, available foods, family traditions, religion, cultural habits, prejudices, fallacies, transportation resources, packaging and advertising. Many of these factors are so obvious it is not useful to discuss them further at this time.

Food habits are developed during the early years, and are quite firmly established when one reaches adulthood. Food habits in adults are stubborn and resist change and improvement. The young child is teachable and has not yet grooved his preferences. It is so much simpler to develop good food habits in the child than in the adult, that nutrition educational efforts should be directed mainly toward the child.

Though mankind eats a great variety of food dishes, the basic foods in these dishes are relatively few. Men eat seeds of cereal grains, various starchy roots and tubers (white potatoes, sweet potatoes, cassava, yams, taro), various sugars (cane and beet), numerous vegetables, numerous fruits, several vegetable oils (olive, coconut, cottonseed, soybean, palm kernel), many varieties of nuts, the meats of several species (cattle, pigs, sheep, poultry, eggs, fish, whale), and milk and milk products (butter, cheeses).

Since cereals, potatoes and roots are cheap sources of calories, these foods loom large in the diets in areas where populations are dense. The foods in the cereal-potato group supply calories cheaply, but are not good sources of protein, vitamins and minerals. Therefore, it is difficult to be well fed on a diet consisting entirely of this type of food. Yet two thirds of the people of the world are living on this diet, with other food used mainly as flavoring materials.

GEOGRAPHICAL INFLUENCES

Flora and fauna vary throughout the world, and as a result the types of edible plants and animals available for the nutrition of mankind differ. To a great extent man utilizes indigenous foods for his nutrition, primarily because they are the

most economical. For instance,[1] a school lunch composed of Mexican foods was one fifth as expensive in feeding 1,000 children in Mexico City for one year, as a school lunch composed of United States type foods, and it was equally as nutritious. Furthermore, the children preferred to eat the native foods.

Throughout the world mankind eats cereals and legumes as staple foods. Geography determines whether the cereal will be wheat (United States, Canada, Europe), rice (China, India), corn (Central America, Mexico), oats (Scotland), rye (Poland) or millet (Arabia). Also the type of legume (peas, beans, soybeans) eaten by the people is primarily the result of geography and climate.

Few people, except in this country, have the wide variety of foods transported from afar, preserved so that seasons are eliminated. Our average "fresh" truck garden vegetable is transported more than 1,500 miles and is about three days old. In many countries, these vegetables are produced within 30 miles and eaten within 24 hours of harvesting. Our foods are not as fresh, but they are more reliable. No longer do people of temperate zones survive on diets consisting largely of bread, potatoes, parsnips, turnips, carrots and cabbage and a few fruits and leafy vegetables and welcome the "spring tonics" which cured their anemias and vitamin deficiencies.

As transportation shrinks the world, the nationalism of certain foods becomes lost. Spaghetti and tomatoes were once strictly Italian foods; oranges, bananas, pineapples and other tropical foods are relatively recent items in our diets; canned milk can now be found in the Congo, along with "Coke." The food patterns are changing, but for many years to come they will have distinctive features in each area.

CULTURAL INFLUENCES

We have demonstrated[2] that the Otomi Indian in Mexico, who lives in extreme poverty and consumes a diet composed mainly of tortillas, beans, pulque and weeds, is surprisingly well fed. Weeds are really vegetables which have not gone to agricultural college. Many weeds deserve study by agriculturalists who can breed out certain undesirable characteristics, and to breed in those which improve palatability, flavor and texture. In the diets of people in Mexico and Central America we have found at least 18 vegetables and edible weeds that are more nutritious than parsley, which is our most nutritious vegetable. We do not have the best plant foods by any means, and even those which we do have (that is, corn, wheat, oranges, potato, tomato and so forth) are inferior to varieties in other countries.

No food is indispensable to man. That the removal of milk from the diet of the United States child would provoke malnutrition does not prove that milk is indispensable to man; rather it shows that the United States diet has been developed around milk as a basic food. In the same way, removal of pulque from the diet of the Otomi Indian may provoke malnutrition, because the Otomi has made pulque a basic food in his dietary. From our investigations[3] we have concluded the following:

1. That the United States dietary is good for the United States, but is not necessary to other peoples.
2. That others can be fed better on diets built around their own indigenous foods.
3. That no food, however good, should be introduced into the diets of other people until it has been demonstrated that
   a. This change is necessary.
   b. This food can be produced locally.
   c. This food is acceptable to the people.

Serious nutritional disturbances have resulted in certain areas where milk powder has been removed from the school lunch program, because milk was no longer available and the area could not produce it.

It appears from a study we conducted on 213 meals 16 years ago,[4] that the content of diets cannot be estimated from food tables currently available. This was confirmed in a recent study of six dinner meals from homes and restaurants. In comparison with the calculated values the contents averaged as follows: fat 68 per cent, ascorbic acid 62 per cent, thiamine 70 per cent, vitamin A activity 71 per cent, calories 74 per cent, niacin 84 per cent, phosphorus 92 per cent, calcium 117 per cent, riboflavin 124 per cent, iron 125 per cent. Very significant amounts of nutrients are lost by destruction in preparation or discarded as garbage.[5] If our current study of hundreds of food samples from this and other countries confirms this, it may mean that the nutrient intake of this nation is much less than presently supposed, a conclusion supported by the calculations of Goodhart.[6]

CHEMICALS AND PROCESSED FOODS

When foods are processed, some chemicals may be added and some portions may be removed. The Food and Drug Administration is carefully policing this situation. Chemicals which are known or thought to be carcinogenic are not permitted in foods at any level. Chemicals which might be toxic at high levels, are permitted only if they are necessary, and then at far below the minimum toxic levels. Without the use of some of these chemicals, insects, pests, rusts, fungi and so forth would destroy American agriculture.

Most foods from plant sources contain compounds which are toxic to some degree.[1] Man avoids the truly toxic plants and animals and does not use them as food. The moderately toxic ones are processed to remove the toxic principles: cyanides in mandioc, phytates in cereals, avidin in raw egg white, thiaminase in certain fish, toxic factors in some varieties of peas and beans, and so forth. Chemicals such as vitamins, minerals and amino acids, which are beneficial and harmless in the amounts used, are added to food products to raise the nutrient values to preprocessing levels (restoration), to raise to levels in competing foods (margarine), to make them nutritionally complete (infant and geriatric foods), or for some other purpose.[7]

Today's white bread has been called a tasteless sponge. However, we found that enriched white bread of the United States ranked second among the 44 samples from 14 countries in 18 nutrients. Also, of the five types of bread studied the best was enriched white and the worst was unenriched white. Thus, enrichment raised white bread from the lowest to the highest among bread in nutritional content. It is fortunate that the enrichment has chemicals added in such minute amounts that no one can taste or see them, because it permits millers and bakers to enrich bread without conflict with the stubborn food habits of the people.

HORMONES IN FOOD

Several years ago it was observed that the fertility of sheep in Australia was seriously reduced. Research revealed that the subterranean clover which had been grown in this arid area contained substances which acted as sex hormones. It is now known many plants contain substances which exert hormone or antihormone effects in animals.[8] Mature rats on a diet deficient in calories but adequate in other respects showed sex retardation and substantially increased life span.[9] Wheat, plum (prune), yeast, sage, potato and soya are known to contain plant hormones which are active as sex hormones.

It is possible that nutrition is relatable to juvenile delinquency. Tanner[10] has pointed out that menarche occurred at 17 years in the seventeenth century, and has fallen to about 13 years today. Children are maturing sexually much earlier than 20 years ago. Earlier sexual maturity without concomitant earlier mental and social maturity may cause conflicts.

Why are children maturing earlier? Is it due to changes in diet and certain foods contributing compounds which act as sex hormones? Are there natural foods which produce a reverse effect, which may be included in the diet in order to delay sexual maturation? If so, intensive study of the kinds and amounts of these hormone and antihormone substances in foods is indicated.

APPLICATIONS

Diet can affect teeth, especially during early childhood. From the dental viewpoint, good diets are more important in late pregnancy and in the preadolescent years than at any other time in life.

It is possible to influence diet habits in early life, but once they have been established, food habits are difficult to change. These habits are the result of an interplay between many factors, some of which are difficult to control. If a dentist finds the need to give dietary advice to his patient, he cannot avoid the headache of it by referring him to a dietitian or nutritionist —there are too many patients whose diets need improvement and not enough nutritionists to care for them. If nutritional advice is given, it should be with an understanding of the factors which are responsible for the dietary pattern he wishes to improve.

Theoretically, good nutrition consists of eating daily certain quantities of calories, vitamins, minerals and amino acids. It does not matter where these 40 or more nutrients come from. Iron is equally as good from meat as from mangoes; calcium is equally as good from milk as from limestone-treated tortillas and so forth. Though good nutrition is best defined in terms of milligrams and grams of chemical compounds called nutrients, nutrition knowledge must be translated to the consumer in terms of foods—milk, wheat, spaghetti or tortillas.

This translation of nutrition in terms of foodstuffs is difficult and easily subject to error—often serious error. Each food contains a wide spectrum of most nutrients, and differs from others in the relative proportions contained in each. Meals are compounded from a number of foods so that they complement each other and combine to make a good diet. There are many combinations of foods which will give the same result. The combinations that work best in the United States are not the best for other areas. The combinations that work best for the middle class are not the best for the poorer classes in a country. The temptation is to decide on one combination which works, and eliminate the others.

In 1958 the U. S. Department of Agriculture[11] published a simple guide to good eating consisting of four food groups daily as follows:

1. Milk
   Children, 3-4 cups
   Teen-agers, 4 or more cups
   Adults, 2 or more cups
2. Meat
   Two or more servings of beef, veal, pork, lamb, poultry, fish, eggs, dried beans or peas and nuts
3. Vegetable-fruit group
   Four or more servings to include a citrus fruit or vegetable important for vitamin C, and a dark-green leafy or deep-yellow vegetable for vitamin A.
4. Bread-cereal group
   Four or more servings of whole grain; enriched or restored.

This guide should not be applied to people in other countries and would need modifications of the sort shown in the table for cultural groups in this country which are still influenced by foreign food habits.

A plant or animal is considered edible in one society and inedible in another. Food is cultural for most people, not nutritional. They overlook foods which are good because of their cultural background; we tend to overlook culture because of our scientific backgrounds. Peo-

Table • Modifications of food guide for certain cultural groups in the United States

	Irish	Italian	Jewish	Spanish
Milk and so forth	Milk Buttermilk	Milk Cheese	Milk Cottage cheese Sour cream	Tortillas (Ca) Peppers (A)
Meat	Beef stew	Veal cacciatore	Pot roast	Arroz con pollo
Vegetables	Kale Turnip greens	Tomato Salads	Carrot Various greens	Mango Avocado Citrus
Bread—Cereal	Potato	Spaghetti	Rye bread Pumpernickel	Rice

ple do not eat foods because they are good for them—rather because they appeal to their appetite, to their emotions, to their soul. This is why commercial food products are seldom sold successfully for their nutritional qualities alone.

When you criticize a person's food habits and single out certain foods for condemnation, you may be attacking the memories of his mother or his happy childhood. Little wonder he resists, for those are more important to him than a healthy body and sound teeth. Dietary improvements should be based on his present habits, substitutions not denials, evolution not revolution.

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NUTRITION COUNSELING FOR THE DENTAL PATIENT

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Nutrition is important to the pedodontic and periodontic patient. It is the cornerstone of preventive dentistry. Preventive service, which is an integral component of dental practice, is inadequate unless definitive dietary advice or nutrition counseling is included. The nutrition, diet or food habits of the patient may be affecting the patient's dental status, and their appraisal may be the best way to obtain a clue to the dental difficulties. Nutrition is a preventive or therapeutic tool, because basic to all effective counseling is knowledge of what the patient

is already doing. Thus preventive or therapeutic procedures may be adapted to fit his circumstances and hence have some possibility of being followed. Nutrition counseling can also be used for research. Many practical research contributions could be made if practicing dentists gathered data systematically on food habits, dietary intake, conditioning factors, and so on, and related these to changes in dental and periodontal states.

Good nutrition counseling takes time. Little can be accomplished in an initial interview of less than a half hour because it takes time for the patient to be at ease and give or accept useful information. Sufficient time must be provided either through a longer initial interview or, preferably, by follow-up contacts of shorter duration. Often the patient cannot absorb all the information given him during his first visit and later many questions arise when he tries to carry out instructions. It is important that these be dealt with carefully and not disregarded. Small practical points may make the difference in whether or not instructions will be followed, and the willingness of the interviewer to help on these serves to impress the patient with the importance of his food habits to his dental welfare. Follow-up visits also impress in the mind of the patient the association between dental health and good food habits.

Nutrition counseling requires adequate space in the office because food habits are very personal and some degree of privacy implies respect for their personal character. Freedom from distractions aids in taking a dietary history on recall or in obtaining the careful reflection and concentration required for instruction. This is difficult amid the hustle, confusion and distraction found in an unenclosed corner of a busy office.

"Rules of thumb" or slavish adherence to some pet nutrition theory are not enough for adequate counseling. The counselor should be thoroughly familiar with what is known and as thoroughly with what is not known. His opinions should be based on best possible knowledge, but he should maintain an open mind to other possible points of view and to new findings. Most important, the counselor should have an appreciation of what goes into the formation of food habits, their significance and the factors which may affect them. He should realize that food intake and eating habits are among the most complex facets of human behavior[1] and that when one attempts to influence them he is not dealing just with physical nourishment. Instead he is using an intellectual approach to a highly involved behavior pattern in which food acceptance is a composite of biochemical, physiologic, psychologic, sociologic, cultural and educational factors. This is why it is one of the most difficult aspects of human behavior to change and why a good nutritionist needs to learn as much as possible about the person being interviewed. People cling to their customary food habits, especially when disquieting events are taking place in their lives; food to them has far more significance than mere physical nourishment.

EFFECTIVE NUTRITIONAL GUIDANCE

Obtaining adequate dietary information or giving nutritional guidance effectively depends on good rapport between interviewer and patient. Therefore, the interviewer needs to be someone who recognizes and understands the needs and attitudes of the patient[2]; that is, his need to protect and preserve his self-respect, which may be expressed as "superior" attitude, defiance, hostility or anger; his fear, expressed as anxiety, insecurity, restlessness; his need for dependency and love. Each patient is an individual and has his own attitude and needs which must be considered. The counselor should have the ability to put the patient at ease by a warm, friendly manner backed by absolute sincerity and honesty. Counseling is a matter of building the right cli-

mate so that the patient will feel free to talk and be comfortable enough to be able to make maximum use of his intellect in absorbing what he is being told. Empathy, the ability to project one's self into the role of the patient with sensitivity to his needs and feelings but without overidentification, is a great help. Who the counselor is in terms of training is not as important as that he or she is the right kind of person, be he or she nutritionist, dietitian, dental hygienist, office helper or the dentist himself. Ideally one could wish the dentist himself could take on the responsibility for nutrition counseling, for surely the words of no one else would have more prestige or status with the patient. Anything he tells the patient has significance over and above what anyone else in his office may tell the patient. At the very least, it is his responsibility to give the counselor and her function prestige value in the eyes of the patient and to that end he should make provision for receiving reports periodically from either the counselor or the patient, preferably both. To be effective, nutrition counseling needs to be coordinated with the rest of the dental therapy.

There are no standard or uniform procedures which should be laid down as applicable to all patients in the hands of all therapists. Technics should be adjusted to the needs of the individual patient at the time instruction is being given and to the skills of the particular nutritionist. It may be useful to talk not only with the patient but with the person responsible for his food planning, purchase and preparation. It is far better to interview children separately from their parents, though information from both may be useful.

To be effective, the nutritionist should attempt to get some understanding of the patient's personality, his general life circumstances (and in particular those which may have influenced his present condition and his eating habits), his reaction to whatever is the difficulty which brought him to the counselor, what motivations may be meaningful to the patient in trying to get him to follow any new food patterns or habits, and what special resistances may need to be overcome. One must be concerned not only with what the patient eats but also with why the patient has been selecting and eating his past and present foods. The latter inquiry takes one not only into a consideration of the present complaint and illnesses but also of past nutritional history, the family history, food habits, personal oral hygiene habits, systemic conditioning factors and social history.[3] In this matter the patient's extraneous comments usually are of far more help than answers to specific questions. Once the patient is relaxed and at ease, more specific questions related to food intake and food habits may be covered quite quickly: where he eats, with whom he eats; when and under what circumstances; perhaps food preparation and storage facilities; possibly shopping facilities; money available for food; regularity of eating patterns; the usual (if any) eating pattern, as to what, amount and variations; between-meal eating—what, when, under what circumstances.

It is useful to have a simple form for recording all the various items into which inquiry is made as well as a form for a simple dietary history. It is advantageous to provide opportunity for recording diet practices previous to the dietary history interview. The simplest possible form with instructions to record "everything which is put in the mouth and swallowed" often is best. This should be kept for at least seven consecutive days which, of course, includes a week end.

There are many ways in which dietary histories may be summarized and evaluated, the method to be used being dependent on the use to be made of the material by the dentist or nutrition counselor.

In making diet therapy recommendations every attempt should be made to

retain all that is possible of the patient's present food habits, making as few changes as necessary to accomplish the therapeutic purpose. It is fruitless to give advice which cannot reasonably be adapted to the patient's usual pattern of living. A printed diet list should be avoided as much as possible, or if used, should definitely be personalized or individualized so that the patient will feel the plan is developed for him to fit his particular needs, as indeed it should be.

SUMMARY

There is a place for nutrition counseling, particularly for the pedodontic and periodontic patients. Effective nutrition counseling takes time, little can be accomplished in an initial visit of 10 or 15 minutes; in most instances involving therapy, shorter follow-up visits are desirable. Nutrition counseling takes space. Food habits of an individual are very personal matters and discussions involving them deserve the respect of some privacy. A quiet, calm place free from distractions leads to more effective counseling. Effective nutrition counseling takes background knowledge and should not be based on rules of thumb alone. Effective nutrition counseling is a skilled process, the success of which is dependent largely on the selection of the right counselor. All counseling should be patient-centered, adapted to the whole personality of the particular patient concerned with his specific cultural background and real life situation of the moment.

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CONCLUSIONS OF STUDY GROUPS

The Conference participants were assigned to four study groups, under the chairmanship of Doctors Abraham E. Nizel, James Shaw, Robert S. Harris and Charlotte M. Young, for the purpose of evaluating knowledge and making recommendations on questions relating to nutritional diagnosis, diet in formation and maintenance of dental structures, effects of food and food additives on caries and nutritional counseling for the dental patient.

A brief summary of the groups' conclusions follows.

NUTRITIONAL DISEASE AND DIAGNOSIS

There was general agreement that the classical forms of nutritional deficiency disease have declined, particularly in the United States, but that poor dietary habits and nutritional imbalance, such as that related to obesity, are very common. Nutritional disorders may be defined as metabolic imbalances, resulting from quantitative or qualitative (or both) defects in one or, more likely, a number of nutrients. For diagnostic purposes, medical and dietary histories, clinical signs and symptoms, and laboratory tests should be used. A dietary record of seven consecutive days provides useful diagnostic information. Both oral signs and symptoms of nutritional disease are nonspecific. Changes in size, color, texture and consistency of the mouth tissues, as well as such oral symptoms as xerostomia, stomatodynia and gingival tenderness, may reflect nutritional imbalance. In the

absence of clinical signs and symptoms, a diagnosis of subclinical nutritional deficiency may be revealed by biochemical tests, but their reliability is questionable, and, therefore, they have only ancillary value.

TOOTH STRUCTURE

Food intake may influence tooth structure and resistance to caries by means of (1) its systemic influence on matrix formation and mineralization, (2) its local effect on the enamel surface, or (3) effects operating through the saliva. Modification of the resistance of the formed tooth through metabolically mediated nutritional effects has yet to be demonstrated.

Recent findings regarding the histological structure and chemical composition of the teeth give little evidence that the calcium and phosphorus content of animal teeth can be modified by dietary means. However, carbonate-phosphate ratios have been altered by drastic dietary practices in experimental animals. These changes have not been clearly related to caries susceptibility. The fluoride content of teeth varies directly in proportion to the amount ingested, and there is a proportionate reduction in caries. More knowledge is needed on the distribution of carbonates, fluorides, citrates, and so forth, within the tooth enamel. The inverse ratio between the fluoride gradient decreasing from the surface inward in contrast to the carbonate increase from the enamel surface toward the dentin is of particular interest and may have importance in determining susceptibility to decay and its progress after the initial attack on the teeth.

FLUORINE

There is no longer any doubt that fluorine reduces dental caries in man and animals, and convincing evidence indicates that this is the result of increases in the fluoride content of the enamel, which take place at the later stages of tooth formation and at the time the tooth first erupts into the oral cavity. Placental passage of fluorides to forming teeth has not been shown; therefore, the full benefits of fluorine can be conferred by postnatal ingestion.

To obtain the protection of fluorine where water supplies cannot be fluoridated, home preparation of fluoridated water for drinking and cooking is best. There is a paucity of reliable information regarding the efficiency and safety of additions of fluorides to other liquids or foods, or the effectiveness of fluoride tablets, lozenges and so forth. The use of fluorides in liquids, foods or sucking lozenges, which bring fluoride in solution into contact with the tooth surface would, on theoretical grounds, be more effective than swallowing fluoride in pills, where no direct contact with the tooth would be provided.

Applications of fluoride solutions on tooth surfaces are effective in reducing decay, and their proper use by dentists and dental hygienists should be increased. However, it would be tragic if advertising campaigns deluded the public, or the dental profession, into believing that even regular and careful use of tooth pastes containing fluoride were anything like as effective or in any way a substitute for water fluoridation.

PHOSPHATES

Although neither the optimal level nor type of phosphate compound has been agreed on as an ideal diet supplement, many different investigators have shown that a variety of phosphates can reduce dental caries in hamsters and rats. As yet, there is no adequate demonstration of the ability of phosphates to reduce caries in human subjects. Available evidence indicates that the phosphate effect is post-developmental and acts locally on the tooth by means of a common ion effect interfering with decalcification of the enamel surface; by adding to the inherent

resistance or helping remineralization of the enamel surface; by changing the acid-producing potential of the oral bacteria, or by acting in some way through the saliva. The promise that phosphate enrichment of carbohydrates would be a practical public health procedure has stimulated tests in human populations.

CARBOHYDRATES

Unquestionably, one of the primary factors in the etiology of dental caries is the bacterial metabolism of carbohydrate-containing foods retained on the tooth surface. This is adequately supported by clinical observations in human subjects and the failure to produce experimental caries in animals in the absence of carbohydrates. Furthermore, in human beings, the frequency (between-meal eating) of carbohydrate ingestion is directly related to caries incidence. It is important to differentiate between the caries-producing capacities of different foods containing carbohydrates by determining how much of a given food is retained, the tendency of such a food to be fermented by bacteria and the possible presence of substances in the food which might modify decalcification or other reactions at the tooth surface. To date, however, investigations in this area do not provide adequate grounds for making dietary recommendations.

PHYSICAL PROPERTIES OF FOOD

The relationships between the physical characteristics of the food and caries are not adequately understood. There is ample evidence that carbohydrates in liquid form are less cariogenic than when they are used in a nonliquid state. Although hardness of the food and resultant mastication may contribute to a reduction in caries, no adequate evidence has been offered to support this view. Clinical studies are needed to test this hypothesis and to indicate whether there is any justification for recommending natural or artificial chewing products to provide the detergent, abrasive or functional effects of primitive diets. At this time, there is no clear-cut evidence to show whether chewing gum has a direct influence on caries activity or calculus formation.

The physical properties of the diet probably have importance in respect to periodontal disease, but, as yet, there is little evidence from which to draw definite conclusions. In experimental animals deposits of sticky carbohydrates around the teeth seem to contribute to periodontal disease.

SUGAR SUBSTITUTES

Because their sweetness makes it possible to replace some of the sugar in confections, the use of sugar substitutes, such as saccharin or sucaryl, are useful in caries control. However, the substitution of other sugars, such as sorbitol, mannitol and lactose, for ordinary food carbohydrates, is not advisable, because these sugars are more difficult to metabolize and may even produce a pathologic condition.

SALIVA

There is no question that in man and in experimental animals the saliva plays a vital role in the maintenance of normal teeth. It is certainly the vehicle through which systemic nutritional effects modify the oral environment or reinforce the enamel surface. However, from the data available it is not possible to point out a single salivary component having a consistent correlation with caries susceptibility. Because of the complexity of the variables in salivary studies, much investigation is needed on ways of collection and handling of samples, on methods of chemical analysis, or even on the standardization of patients in the hours previous to the actual collection of saliva samples.

ANIMAL STUDIES

Although animal studies have played a useful part as a screening procedure in caries research, the ideal experimental animal for research on tooth decay is not yet available. Rodents are not completely satisfactory because of variations in caries susceptibility and species differences in the types of lesions produced. The mouse, the rice rat and the hamster have been used for periodontal research, but too little is known of their response to choose one of these over the other. Only a few studies have been done with subhuman primates, and these animals offer sufficient promise that the possibilities of using them should be subject to intensive investigation. In general, although animal studies have not yet produced significant practical results at the clinical level, they have contributed to clarifying basic facts about dental disease. Caution should be used in applying animal findings, including those indicating apparent infectivity of caries, to human subjects.

NUTRITION COUNSELING

Nutrition counseling is particularly important to the pedodontic patient because it is a definitive method for maintaining the integrity of the restored dentition. For the patient with periodontal disease a diet of proper consistency and detergency will contribute significantly to periodontal health. Nutrition counseling can be used for accumulating research data. Effective counseling takes time. Not much can be accomplished in one visit, nor in a short visit of 10 or 15 minutes. Proper counseling may take 30 minutes to an hour. Follow-up visits are not only desirable but a requisite to success. Food habits are very personal matters, and discussions of them deserve the respect of some privacy and freedom from distractions. The counselor, whether nutritionist, dental hygienist or dentist, should have an understanding of factors that influence food selection, but being the right kind of person and having empathy is more important than the amount of training received. In making diet evaluations, children are best interviewed separately from their parents. The adequacy of diets may be evaluated, either in terms of nutrient content or food group. Dietary recommendations should (1) deal with the factors that motivate the patient's food selection, (2) praise and retain the good points in the patient's present diet and (3) make the fewest changes compatible with accomplishing the therapeutic objective because drastic changes in patients' food habits are usually not practicable.

TEACHING AND RESEARCH

Teaching of nutrition and nutritional counseling should be an integral part of the course of study in dentistry. Because nutrition and nutritional counseling are related to all branches of dentistry, a vertically integrated program should be initiated at the basic science level and followed through into the clinic. Professional nutritionists and dental auxiliary personnel could be used in this program.

It was agreed that there was a tremendous need for research and that there would be much profit if research-minded dentists directed less attention to experimental animals and more time to work with human subjects. Further exploration of the topics opened up at the conference was deemed necessary.

Vibracentric equilibration of centric occlusion

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To maintain the health of the masticatory mechanism, the centric occlusion must be stable, free from impediments, and synchronized with the centric relation of the mandible. The key to centric occlusal adjustment is the accurate registration of the centric relation. A simple, rapid and effective method has been developed for determining and establishing a physiologically accurate centric relation and centric occlusion, for both natural and artificial dentitions. An "equilibrator" instrument is used which produces vertical reciprocal vibrations.

In recent years, the occlusion of the teeth has received increasing attention and study regarding its effect on the masticatory apparatus. It is now generally accepted that the effect of occlusal disharmonies on the mandibular position is responsible for many of the disorders commonly affecting this intricate structure.[1-3]

Reassessment of the traditional concepts of tooth function and occlusal requirements such as outlined by Jankelson[4] and co-workers indicates that no significant contact between the teeth occurs either in incisive or masticatory movements. Only during deglutition does significant tooth contact occur during function, since the musculature involved achieves its optimum mechanical advantage when it can perform with the mandible braced by the centric occlusion of the teeth.

Jankelson[4] states that "The evidence strongly suggests that centric occlusion is the only tooth contact of any significance that occurs during stomatognathic function." Incidental tooth contacts made in relations other than the centric occlusion are normally expected to fall well within the range of physiological tolerance of the masticatory mechanism. From the standpoint of trauma, it would seem that the truly traumatic effects on the masticatory apparatus occur essentially in the centric occlusion of the teeth where the full power of the elevating muscle complex finds its terminus.

In the course of a day's activity, the mandible will seek to brace itself with the centric occlusion many times during such actions as deglutition and the clamping and clenching of the teeth which are associated with physical and emotional stress. Obviously, it is during the act of bracing the mandible with the centric occlusion of the teeth under the influence of the powerful elevator muscles that the traumatic effects of occlusal discrepancies manifest themselves.

These discrepancies give rise to traumatic patterns throughout the entire masticatory mechanism. Their presence develops horizontal thrusts which affect the

teeth and supporting structures. They provide the proprioceptive stimulus required to initiate clamping and nonmasticatory grinding movements which cause trauma and wear.[5] They transmit irritating impacts to the elevating musculature resulting in a disturbance of the neuromuscular mechanism. If impediments to the entry into centric occlusion are present, they may guide the mandibular posture into traumatic eccentric terminal relationships which could produce temporomandibular joint symptoms.

From the standpoint of the health of the masticatory mechanism, therefore, the centric occlusion of the teeth assumes tremendous importance. It must be stable, free from impediments, and perfectly synchronized with the centric relation of the mandible.

In order to stabilize centric occlusion and synchronize it with centric relation, it is necessary that impediments to the entry of the teeth into centric occlusion are located and eliminated. It is possible to locate these impediments only if the centric relation of the mandible can be positioned accurately. The key to centric occlusal adjustment, therefore, is the accurate registration of the centric relation.

Conventional methods for the registration of the centric relation either directly or indirectly continue to utilize the elevator muscle complex. The Sicher studies[6] show that the mandible from the rest position to the point of tooth contact assumes a true centric relation to the skull and for all practical purposes rotates as a true hinge. When tooth contact occurs, this relation remains constant only if the centric occlusion of the teeth is stable.

Occlusal discrepancies guide the mandible into acentric terminal relations. When these disharmonies produce prolonged, intermittent irritation of the masticatory musculature, a disturbance of the neuromuscular mechanism results in a protective shift in function by the muscles involved. Thus, an "acquired" centric occlusion and an "acquired" centric relation develop which, in effect, represent a dislocation of the temporomandibular articulation. It is apparent that the traumatized elevating musculature cannot be relied on to furnish an accurate centric position, and that these muscles must be bypassed during centric registration.

DEPRESSOR MUSCLE GROUP AND CENTRIC RELATION

The mouth opens against external resistance by the contraction of the suprahyoid and infrahyoid groups of muscles. The application of an external elevating force to the mandible activates the depressor complex and relaxes the elevator muscle group. The infrahyoid muscles contract to immobilize the hyoid bone which in turn serves as a base on which the suprahyoid muscles may contract to depress and retract the mandible. If this elevating force is sufficiently irritating, the mandible will seek to brace itself against it. With the elevators relaxed, the mandible cannot brace itself in the usual manner by the occlusion of the teeth. This required bracing action can be obtained only by the physiologically braced retrusion of the condyles within the glenoid fossae.

In this situation of "joint bracing," the mandible is capable of a true hingelike rotation and the hinge, by virtue of the action of the depressor muscles, may be described as a "spring-loaded" hinge. This creates an axis of rotation firmly fixed in centric relation and a clinically ideal arrangement for the technic of centric registration to be described in this paper.

The "spring-loading" of the mandibular hinge is simply affected by the application of external elevating pressure to the mandible by means of an instrument which produces vertical reciprocal vibrations. The instrument, herein referred to as the "equilibrator," delivers vibrations to the mandible through a chinrest. The

vibrations are of sufficient frequency and impact intensity to initiate and maintain a physiologically braced retrusion of the condyles within the glenoid fossae and to cause the "spring-loading" of the mandibular hinge by the stimulation of the contraction of the depressor muscle group.

The chinrest of the equilibrator is applied to the mandible in the rest position with an elevating pressure. This elevating pressure causes the "spring-loading" of the mandible by virtue of its effect on the inframandibular musculature and the vibrations stimulate the condylar bracing. The operator slowly elevates the mandible through the freeway space, through the depressant muscle tension to initial tooth contact. The mandible is now rotating rapidly around a braced hinge axis of rotation in correct centric relation.

When tooth contact is achieved under these conditions, the teeth will vibrate vertically against each other in the correct centric occlusion. Since tooth contact is made while the dominant force is depression rather than elevation and since, while the depressors are in force the traumatized elevators are relaxed, there are no factors at work to cause the mandibular centric relation to be deflected. As a result, impediments to the entry into stable centric occlusion will be the only tooth surfaces involved in the vibration pattern of the teeth. It is a simple matter, then, to locate and eliminate them.

STABILIZATION OF CENTRIC OCCLUSION OF NATURAL DENTITION

With the headrest adjusted so that the occlusal plane is tilted upwards about 10 degrees (Fig. 1, left), the equilibrator is placed in position (Fig. 1, right). Elevating pressure is then directed through the depressing muscle tension to initial tooth contact and vibrating pattern between the teeth is established. The patient will be quick to indicate his awareness of vibrations in specific areas of initial contact. With the patient thus familiarized with procedure, recording of occlusal discrepancies may begin.

Following the procedure suggested by Jankelson,[5] strips of occlusal indicator wax (Kerr) are placed on the lower teeth covering the buccal and labial surfaces as well as the occlusal surfaces (Fig. 2, above left). The equilibrator is applied and the vibration pattern set up between the teeth. Areas of initial contact will be recorded as slight depressions in the wax (Fig. 2, above right). All areas of initial contact found on the buccal and labial surfaces are marked through the wax with a waterproof pencil. These indicated areas are selected for gross adjustment by spot grinding (Fig. 2, left). The process is repeated until all vibrated depressions in the indicator wax appear to be uniform.

The same procedure is then followed on the upper teeth with the recording and spot grinding being restricted to indicated areas on the lingual surfaces of the teeth. When all adjustments to the buccal and labial surfaces of the lower teeth and all lingual surfaces of the upper teeth are completed, the occlusal surfaces are checked in the same manner and gross initial contacts removed.

At the conclusion of this gross spot grinding, the centric occlusion of the teeth will be noticeably more stable; however, the inaccuracies of spot grinding usually result in the exchange of a few gross discrepancies for a greater number of lesser ones. It is now necessary to refine further the adjustment of the centric occlusion.

The fine adjustment of the centric occlusion is accomplished with a paste-grinding procedure during which no lateral grinding movements are made. An abrasive jelly is applied to the teeth (Fig. 3, left) and the vibrating pattern is again established with the equilibrator (Fig. 3, right). Interferences to the centric oc-

Fig. 1 • Left: Correct head position. Right: Equilibrator in position

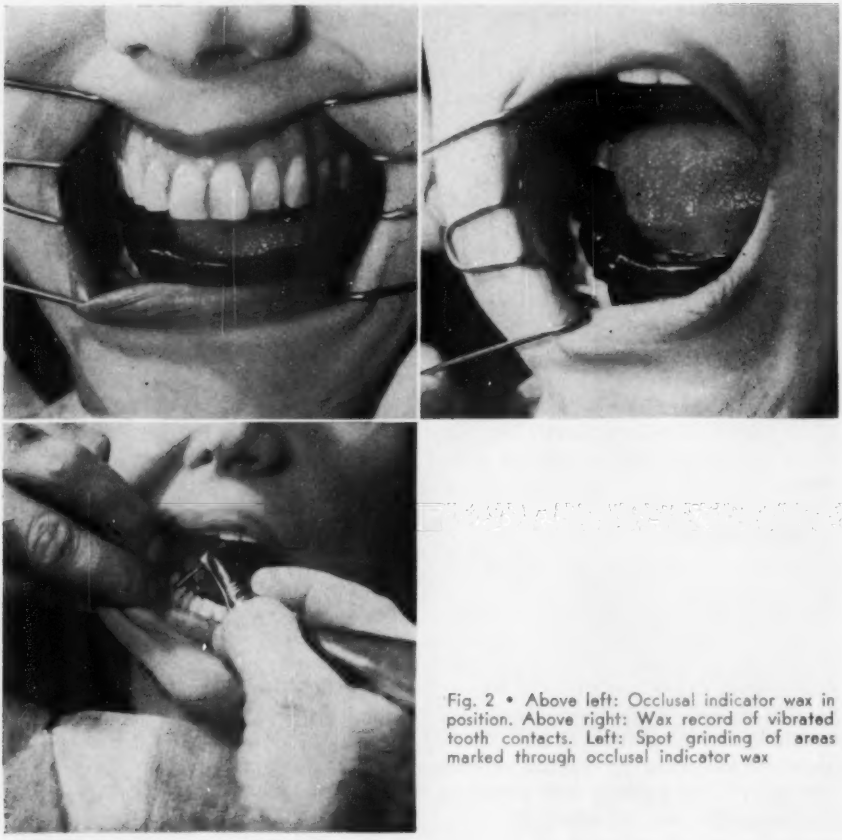

Fig. 2 • Above left: Occlusal indicator wax in position. Above right: Wax record of vibrated tooth contacts. Left: Spot grinding of areas marked through occlusal indicator wax

Fig 3 • Left: Abrasive jelly applied to teeth. Right: Vibrating pattern again established with equilibrator

clusion which remain will be worn away accurately by the abrasive jelly which is carried between the vertically vibrating teeth.

The first appointment involving occlusal adjustment naturally will not produce a terminal result. Within a very short time, the teeth will reorient themselves and new discrepancies will be noted. At subsequent appointments these slight deviations are eliminated quickly by the paste grinding alone. Usually, three or four short paste-grinding sessions after the initial treatment are sufficient to achieve a static stability of the centric occlusion which is meticulously synchronized with correct centric relation of the mandible.

EQUILIBRATION OF CENTRIC OCCLUSION OF ARTIFICIAL TEETH

The fundamental concept of the vibracentric technic will apply to the registration of the centric relation during denture construction. When wax rims are inserted at the correct vertical dimension, the mandible may be vibrated in the manner described to record the centric relation accurately. The pressure and vibrations of the equilibrator will cause the physiologically braced retrusion of the condyles, and the correct centric position is located quickly and automatically. Dentures constructed with centric relation recorded by means of the vibracentric procedure will display a centric occlusion which is accurately integrated with correct centric relation.

The same problem exists, however, as far as developing centric occlusal stability is concerned. Indeed, it is an even greater problem when the laboratory errors which are encountered during the processing of acrylic resins are considered.

Basically, the procedure for the vibracentric equilibration of the artificial dentition is the same as for the natural teeth, except that only the paste-grinding phase is used. However, the nature of the denture-bearing tissue exerts a complicating influence during paste grinding. The vibrations between the teeth which are necessary in order to accomplish the grinding are nullified by the shock-absorbing qualities of the denture-bearing tissue. To offset this, an indirect method of grinding involving a vibracentric articulating device is used.

CLINICAL PROCEDURE

It is of the utmost importance that the denture bases are extremely stable. Den-

ture bases are thoroughly adjusted first using a pressure-indicating paste (Fig. 4, above left). The occlusal surfaces of the lower teeth are lubricated and the lower denture is inserted. On the upper posterior teeth, a small rod of counter wax is extended from the bicuspid to the molar area bilaterally (Fig. 4, above right). The upper denture is inserted and the wax rods are permitted to temper in the mouth. The mandible is then manipulated in the manner described with the equilibrator. Centric relation of the mandible is established automatically and the correct centric occlusion will be recorded as depressions made by the lower teeth in the soft counter wax (Fig. 4, below left). The mandible is vibrated until the wax is penetrated and the first tooth contact is achieved (Fig. 4, below right). It is important that the recording terminates at the point of first tooth contact, since occlusal discrepancies could guide the mandible into an eccentric relation if it were to be forced beyond initial contact.

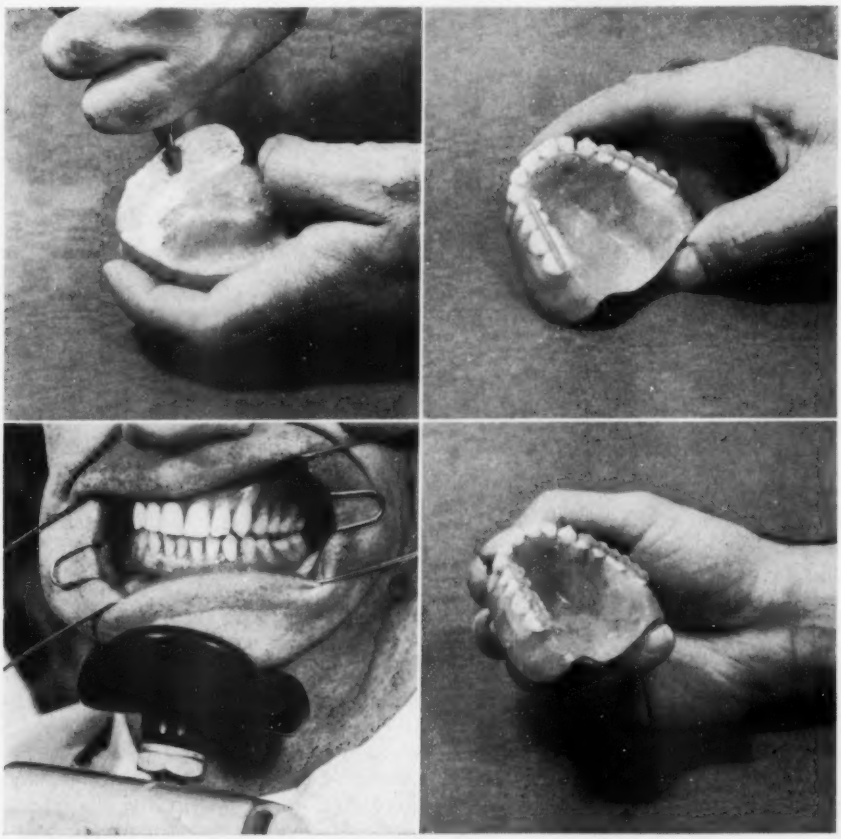

Fig. 4 • Above left: Reduction of pressure areas indicated by markings in surface of pressure indicating paste. Above right: Counter wax rods applied to upper posterior teeth. Below left: Vibrations applied to mandible causing mandibular teeth to be moved into counter wax in correct centric relation. Below right: Wax impression of mandibular teeth as developed by vibracentric manipulation of mandible

Fig. 5 • Left: Dentures luted together. Below left: Dentures mounted on articulator. Below right: Correct position of articulator during vibracentric grinding of dentures

The lower teeth are now carefully seated into the upper counter wax record and the dentures are luted together with sticky wax, making certain that the wax record is not distorted (Fig. 5, left).

The articulating device which is used in the remounting has a calibrated vibrating element built into the base. It has an accurate hinge axis of rotation in the upper arm which is capable of only vertical rotation. This eliminates all lateral movements which could result in the incorrect grinding of the teeth.

The luted dentures are mounted in the articulator with the occlusal plane parallel to the base and equidistant between the upper and lower mounting platforms (Fig. 5, below left). Since the teeth during the recording of centric relation were vibrated to the point of initial contact, the luted dentures represent, for all practical purposes, correct terminal relationship. Since terminal relationship is recorded, there is no necessity of mounting the dentures at this time with a face-bow.

In the vibracentric adjustment of the occlusion of the artificial dentition, the recording and spot-grinding phases described for natural dentition may be omitted. After the dentures have been correctly mounted on the articulating device, the teeth are paste-ground until centric

occlusal stability is attained (Fig. 5, below right). The abrasive jelly is applied to the lower teeth and the vibrating element in the base of the instrument is activated.

This results in the situation described earlier in the adjustment of the natural dentition. The teeth now are vibrating vertically against each other in the presence of the abrasive. They are mounted on the articulator in correct centric relation. As occlusal impediments are encountered, in the vibrating pattern, they will be eliminated quickly and accurately by the action of the abrasive between the vibrating teeth. The dentures may then be recovered from the articulator and inserted with a stable centric occlusion that is accurately integrated with the requirements dictated by the centric relation of the mandible to the skull.

CONCLUSION

There has been a growing awareness of the need for a simple and accurate method of occlusal adjustment and equilibration. Occlusal requirements have received a great amount of attention and study. Recent work in this field has emphasized the importance of a stable centric occlusion. The experimental results of these studies have proved that the forces of traumatic occlusion are manifest primarily when the teeth are in centric occlusion. A simple, rapid, and effective method of determining and establishing a physiologically accurate centric relation and centric occlusion has been developed for both natural and artificial dentition.

733 Washington Road

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Specialization • The return to scientific philosophy negates . . . the fears so commonly expressed that scientists are becoming a class apart from the rest of society by developing a culture without contact with the rest of human life. It is true . . . that within the area of his particular work each scientist becomes so specialized that he finds it difficult to communicate on scientific subjects except with other workers in the same specialized field. But this situation is not peculiar to science. It exists just as much in other forms of learning—in philology or Moslem culture as much as in mathematics or genetics. Moreover, science should not be regarded as one single discipline concerning which sweeping statements can be made, any more than this can be done for the so-called humanities. . . . We must accept as a fact that the modern world is made up of an immense number of specialized groups, intellectually separated by experience, words, and the meaning of symbols. In my opinion, there are not "two cultures," even though C. P. Snow has made the expression famous. There are a multiplicity of intellectual occupations, each of which fortunately has several points of contact with human life. Whatever his field of specialization, the scholar can be understood beyond the confines of his guild—but only if he is willing to raise his language above the jargon of his trade. The scholar must learn to speak to man. *René Dubos. The Dream of Reason. Horizon 3:4 July 1961.*

Acrylic trial copings for balanced fixed bridgework

Arthur C. Sandler, D.M.D., Revere, Mass.*

A method has been developed for the transfer of occlusion from the mouth to artificial articulators for the purpose of constructing a fixed partial denture with precision and accuracy. The opposing occlusion is registered in a doughy mix of self-curing, tooth-colored resin which is allowed to cure in the mouth. The method is effective, economical, and has proved successful in use in more than 100 patients. It can be utilized readily by the general practitioner.

The reproduction of functional occlusion, with its connotation of movement, is one of the current problems of restorative dentistry, as opposed to that of centric occlusion which relates to a maximum contact of the occlusal surfaces of the teeth and is static in nature. This movement, effected by the muscles of mastication, is restricted by the temporomandibular joint, learned neuromuscular patterns and existing cuspal angulation.

Occlusal discrepancies can be detrimental to the longevity of a fixed prosthesis, large or small, because of damage to the underlying periodontium. For this reason, tissue insult from occlusal trauma must be avoided, and the degree to which stresses and strains can be imposed on these supportive structures must be gauged by what the tissues actually can bear.[1,2] Undue stress on the periodontium caused by artificially induced occlusal discrepancies may be avoided by accuracy of occlusal transfer. The end result of such effort is the achievement of balanced fixed bridgework, harmonious physiologically and functionally with preexisting occlusal restrictions and requirements.

General practitioners have been seeking a solution to this problem for a long time. Methods involving the use of precious metal cast copings, with the concomitant laboratory fees, have posed a problem because such copings have become prohibitive financially for everyday fixed partial prostheses. Other means for fabricating transfer copings using technic metals have also been used but have been shown to be cumbersome. The wax squash bite as a substitute method for occlusal transfer has proved inaccurate, and subsequent loss of chair time due to the necessary occlusal adjustment of the crowns has made it costly. Use of a gnathoscope for reproducing the relations of the maxilla and mandible requires special training at the postgraduate level.[3,4] Since no instrument can duplicate mouth functions accurately, a simpler and less expensive method using the human mouth as an articulator suggested

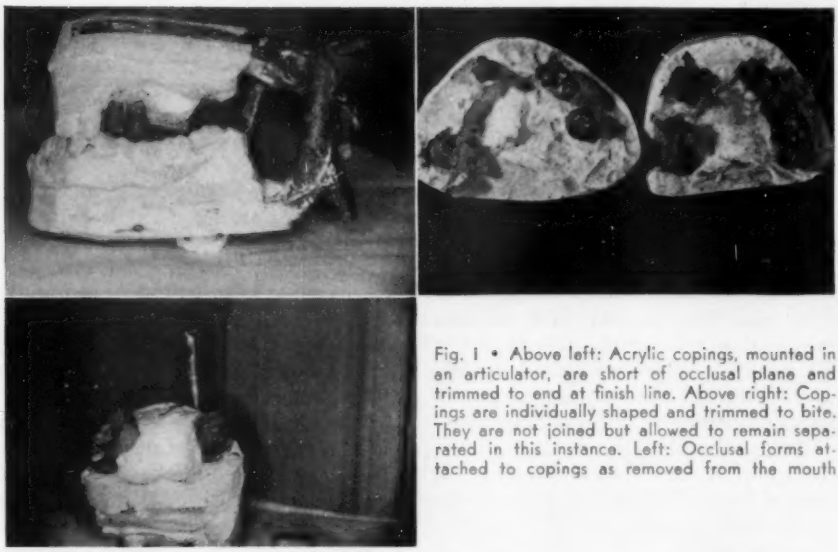

Fig. 1 • Above left: Acrylic copings, mounted in an articulator, are short of occlusal plane and trimmed to end at finish line. Above right: Copings are individually shaped and trimmed to bite. They are not joined but allowed to remain separated in this instance. Left: Occlusal forms attached to copings as removed from the mouth

itself as a possible solution. Consequently, a method for occlusal transfer has been developed which is effective, economical, and can be utilized readily by the general practitioner.

METHOD

The method developed utilizes a self-curing resin which is very "dead." Originally this material was used to produce acrylic patterns for inlays. Frankel has described another technic which also utilizes acrylic copings but only for the positioning of the dies.[5] Accurate electroformed copper dies, made from individual copper band impressions, using modeling compound as the impression medium, form the basis of the technic. These dies are first mounted with the aid of a preliminary wax bite. Copings are then fabricated by the paint-on method using the red inlay pattern acrylic resin (Fig. 1, above left). The copings are allowed to cure in a water bath at 120°F. When cured, they are trimmed to the finish line on the dies and shaped to give them individuality, making certain the copings are shy of the occlusion (Fig. 1, above right). The labial or buccal surface is notched to aid in orienting the copings when placing them in the mouth. To minimize distortion, the copings are stored in water until used.

At the next visit, the copings are seated, their gingival fit noted, and their occluding surfaces checked to be sure they are short of the occlusion. The occlusal surfaces are roughened and painted with monomer, and a doughy mix of self-curing tooth-colored resin in the form of a roll is applied to the copings. The patient is instructed to hold the mouth closed with the teeth in centric relation and the impression of the opposing occlusion is registered in the acrylic resin which is allowed to cure in the mouth with the teeth occluded. In order to prevent bonding of this acrylic resin with any other in the mouth, for example, veneer crowns of other prostheses, a coating of Fluorolube[6] is used. This also protects the gingival and oral tissues from chemical irritation of the monomer.

After the occlusal form has cured, it is removed from the mouth in one piece together with the attached copings (Fig. 1, left). Excesses are trimmed and the bridge is replaced in the mouth for a plaster impression of the arch with the acrylic resin in place. This, together with the counter model, is mounted in an adjustable articulator for the construction of the bridge (Fig. 2, above left and right; below left). If a plaster impression cannot be removed because of undercuts, compound may be used. With the two models thus articulated and mounted, it is possible for the laboratory to judge the occlusal relation and fabricate accurately balanced crowns or bridgework.

When a straight-line articulator is used for construction of small bridges, the method is modified slightly. After the occlusal form is produced and removed from the mouth, it is trimmed to allow freedom for lateral excursions of the mandible. The acrylic resin is overlaid with melted inlay wax and replaced in the patient's mouth so as to obtain a panorama of his occlusion. A counter model of this panorama is poured and mounted in the articulator to be used as a counter model against which the crowns are fabricated to occlude.

If the operator prefers, the copings need not be joined by the acrylic resin occlusal registration. Instead, the occlusion related only to each abutment tooth need be registered and the individual copings allowed to remain separated, no occlusion being registered for the edentulous areas.

Although an additional visit usually is allowed for the fitting of the cast crowns, it has been our experience that, if the dies are accurate and the copings constructed to end at the finish line, construction of the entire bridge can be completed without further reference to the

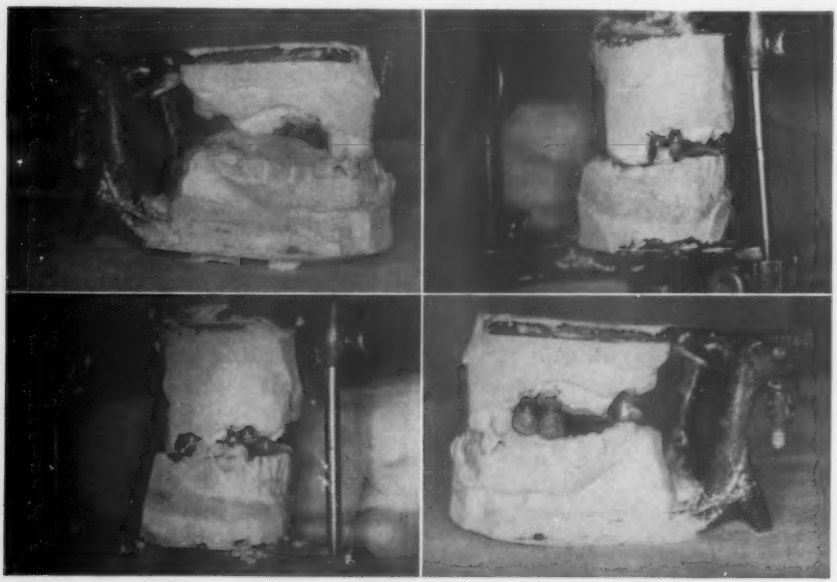

Fig. 2 • Above left: Copings with attached occlusal form occluding with counter model in articulator. Above right and below left: Copings with attached occlusal form occluding with counter model in articulator. Below right: Crowns in articulator showing good occlusal balance

mouth. Occlusal adjustments seldom are necessary after insertion but occasionally some minor adjustment may be required (Fig. 2, below right).

By the same method, the vertical dimension of a given prosthesis can be altered. If greater vertical dimension is required, a comfortable height is established and maintained by means of temporary bridgework.[6] The copings are then inserted and the bite taken at the new vertical dimension. In order to prevent closure, blocks of acrylic resin are inserted in the unaffected side. If the prosthesis under construction is bilateral, then the bite on each side is taken alternately and the contralateral side serves to prevent closure of the predetermined vertical dimension by means of the hardened acrylic block (Fig. 1, left).

In addition, this method can be adapted to temporary bridgework by means of the copings. Because these copings are fitted accurately, they can be used in temporary bridges which may have to remain in the mouth for prolonged periods of time. This temporary bridge also can be utilized as a periodontal splint for stabilizing mobile teeth.[6-8]

CONCLUSION

A method has been developed for the transfer of occlusion from the mouth to artificial articulators for the purpose of constructing a fixed partial prosthesis with precision and accuracy. This method can be used for small and large prostheses with the same degree of accuracy and minimum of chairtime loss for the operator. The end result is economical balanced bridgework. It has been used by my associate, B. Sagall, and myself in over 100 patients and has proved its worth each time.

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Man-made Radiation • A study prepared for the National Academy of Sciences, and these figures are in close agreement with those reached in other studies, indicates that, taking the level of natural radiation as 1, the level of man-made radiation would be about 0.9. Most of this (85 per cent) stems from medical and dental diagnostic x-rays, and an additional 8 per cent from medical x-ray therapy. Nothing else seems to amount to more than 1 per cent of the total man-made radiation. Three of these minor sources are of special interest to the public: internal isotopes (mostly strontium-90 fallout plus certain other isotopes which tend to be assimilated into the body), incidental radiation from television sets and luminous dials (mainly on wristwatches). Each of these sources amounts to about 1 per cent of the man-made total. *Science in the News. Science 131:1656 June 3, 1960.*

Clinical investigation on the relation of mercury to the amalgam restoration: II

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To study the effects of physical properties and cavity design on the clinical fracture or deterioration of the amalgam restoration, 257 amalgam restorations were placed, three different manipulative procedures being employed to produce finished restorations of three different mercury contents. The restorations were observed over a two year period. Sixty-four additional restorations were inserted, using the manipulative procedure that resulted in the highest residual mercury content, and were observed for one year. High mercury content was related to marginal breakdown and to surface roughness, but not to the degree of tarnish or corrosion. Reduction of the cavity size resulted in a decrease in the incidence and degree of marginal breakdown.

It is generally agreed that a high percentage of fracture and marginal deterioration of amalgam restorations can be attributed to: (1) improper manipulation resulting in a material with inadequate physical properties, and (2) improper cavity design. However, little, if any, research has been conducted to determine the specific effect played by physical properties and by cavity design on the clinical fracture or deterioration of the amalgam restoration. This present research was initiated in an attempt to shed some light on the influence of these two factors.

The first report in this series dealt with one year observations on restorations that were placed in standardized cavity preparations by three different manipulative technics. Those technics produced restorations with three different mercury contents, and hence three different sets of physical properties. In that report complete details of the development and standardization of the experimental procedure are described.[1]

The cavity design used in the first portion of the study was a Black Class II preparation, modified to provide extra bulk in the "critical" isthmus region. Thus, it was felt that any fracture that occurred could not be attributed to a lack of bulk, but rather to the weakness of the material itself. This group of restorations has now been in service for two years, and this report will cover the two year observation period.

From the time of Black[2] the impor-

tance of bulk in the isthmus region has been emphasized. The means of obtaining bulk in the preparation varies somewhat with individual operators.[3-7] Some advocate increased width whereas others recommend both greater width and depth. It has also been suggested that added bulk should be provided by use of a V-shaped pulpal wall, a V-shaped pulpal floor or combinations of the two.

This particular aspect of cavity design is controversial, however, and there are some who believe that greater emphasis should be placed on preservation of tooth structure. McGehee[8] and Gabel[9] are among those who recommend a narrow isthmus, providing bulk through cavity depth. Perhaps the most conservatively designed cavity is that suggested by Markley,[10] who recommends that the isthmus be narrow and that the step remain relatively shallow.

There is as yet no evidence to indicate the significance of these variations in cavity design and whether clinical fracture or marginal deterioration are influenced by the cavity preparation. Thus the second and major phase of this investigation was to determine the influence of cavity design on the incidence of bulk and marginal fracture.

PROCEDURE

Three manipulative procedures were standardized to produce amalgam restorations with widely different physical properties. The methods of developing these technics were discussed in detail in the previous report[1] and hence only will be summarized in this paper.

Technic A was designed to satisfy all the requirements for the superior amalgam restoration. The finished restoration contained 48 ± 1 per cent mercury with a corresponding 24 hour compressive strength of 49,000 ± 2,000 psi.

Technic B was designed to produce restorations of medium residual mercury content. The residual mercury content in the restorations was 58 ± 2 per cent and the 24 hour compressive strength was 30,000 ± 3,000 psi.

Technic C placed restorations so that the residual mercury content was high, with a 24-hour strength comparable to the one-hour compressive strength of a well-placed amalgam (technic A). The final mercury content of these restorations was 62 ± 1 per cent, and the 24 hour strength was 13,000 ± 2,000 psi.

Restorations were inserted in upper and lower first and second bicuspids and first molars. For the large cavity preparations, an isthmus width of 2.6 mm. for molars and 1.7 mm. for bicuspids was selected (A in Figures 1 and 2). The depth of the cut was 1 mm. below the dentinoenamel junction at the deepest portion of the occlusoaxial walls at the end of the grooves. Thus these preparations provided maximum bulk of amalgam and maximum resistance to fracture.

For comparison, a second series of preparations was made in which the bulk was reduced to a minimum (B in Figures 1 and 2). The smallest Class II cavity possible that would allow provision for proper retention was designed. The cavity dimensions were measured by use of probes, calibrated and bent for positioning. They were of the same design that had been used previously.[1]

An isthmus width of slightly less than 1.5 mm. was selected for molars and 1.0 mm. for bicuspids. The depth at the occlusal step was determined by an initial cut into the deepest portion of the anatomy just under the dentinoenamel junction. In teeth in which sharp occlusal contour resulted in a relatively deep step, the carving of the restoration was exaggerated in proportion to the increase in depth. By the same token, when the contour was rather flat, a corresponding increase in depth was secured by deepening the pulpal floor. Retentive undercuts into the axial walls were produced with no. 33½ inverted cone bur. The axioproximal dimension was slightly under

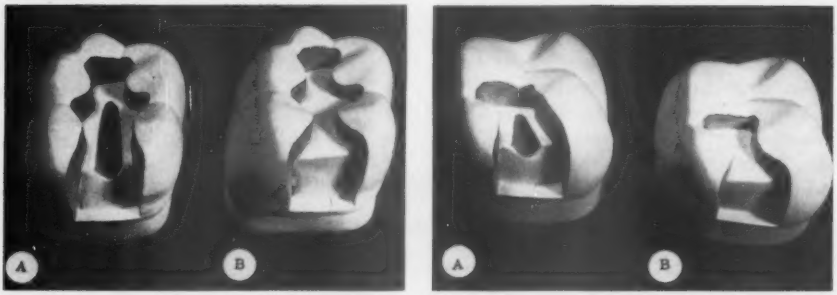

Fig. 1 • Plaster reproductions showing two types of cavity preparations. In each view A is large cavity and B is small cavity. Left: Lower first molars. Right: Upper first molars

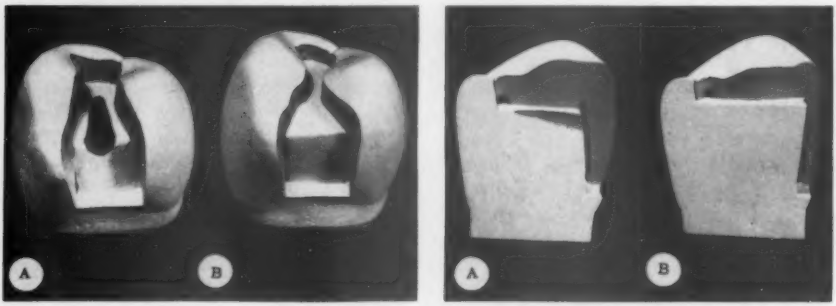

Fig. 2 • Plaster reproductions of upper first bicuspids showing two types of cavity preparations. A, large cavity; B, small cavity. Right: Cross section of cavity preparations in plaster models of upper first bicuspids to compare occlusal depth of two cavity preparations. A, large cavity; B, small cavity

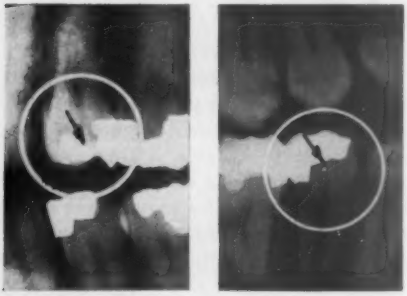

Fig. 3 • Clinical bitewing roentgenograms of small (view at left) and large (view at right) cavity preparations. Sloping pulpal floor produced by groove is evident in large preparation

0.20 mm. for both molars and bicuspids.

The axiopulpal-line angle was sharp and the proximal buccal and lingual retention grooves were prepared by a no. 699 tapered fissure bur. In an effort to avoid undermining the plate of enamel at that area, the grooves were cut partly at the expense of the axiopulpal wall.

Bitewing roentgenograms of both types of cavities are shown in Figure 3. The reduced occlusal thickness of the small cavity (left) is contrasted with the heavy bulk produced by the large cavity (right).

As in the first part of the study, the operator's ability to control the mercury content in this small cavity was evaluated by condensing six restorations in Dento-

form teeth and then determining the residual mercury. As a further check, restorations were also placed in patients, removed and the mercury content measured. The ability of the operator to control the cavity dimensions in patients also was affirmed by taking rubber base impressions of the prepared teeth and measuring the cavity dimensions on the study models.

The clinical procedures were basically the same as in the first portion of the study, except for a reduction in the size of the instrumentation which the small cavity design necessitated. Several clinicians were asked to examine the preparations, and all conceded that this preparation was much smaller in all dimensions than the conventional Class II preparation.

Since one of the primary aims of this study was to determine the minimum requirements for strength that are necessary to the clinical restoration, all restorations were placed by the high-mercury technic C. If fracture occurred, the restoration was replaced by a technic B restoration. If the latter restoration failed, it was in turn replaced by a technic A restoration. All restorations were placed under the rubber dam and a contoured, wedged matrix. An effort was made to leave the restorations in a relatively high occlusal relation, particularly in the areas of the marginal ridge. As in the first portion of the study, patients were instructed to eat as soon as desired, thus subjecting the restorations to heroic environmental and stress conditions.

Sixty-four restorations of this small type cavity were placed in 20 patients who ranged in age from 15 to 40 years. Approximately half of these restorations were placed in the mouths of patients who had previously had restorations in the large cavity preparation, making possible a direct comparison of the two preparations within the same mouth.

Restorations were examined and polished 24 hours after insertion. The restorations were then examined at three-month intervals for one year. The restorations placed in the large cavity preparations had been examined at three-month intervals during the first year, and these observations were continued during the second year of the study. In each instance, the opinions of at least two clinicians not familiar with the project were obtained and these opinions were included in the final evaluation of the data.

RESULTS

The results to be presented are: (1) two-year observations on 257 restorations placed in large cavities by three different mercury technics, and (2) one-year results on 64 restorations placed in small cavities by a high mercury technic.

Dimensional Change and Flow • No evidence of either expansion or contraction of the amalgam could be detected in either type of cavity preparation, nor did examination of the proximal contour and cervical margins of the restorations reveal any indication of flow.

Marginal Failure • The incidence of marginal failure in restorations placed by the three manipulative technics is summarized in Figure 4. In all instances the number of marginal failures continued to increase at a relatively constant rate up to approximately 15 months. Not only was there a decrease in the number of new marginal failures occurring after this time, but there was little or no retrogression of those restorations in which marginal breakdown had appeared at earlier time intervals. The largest number of failures in the large restoration occurred in the group placed by technic C, the high-mercury technic. The number of failures decreased with technic B, and technic A exhibited the least number of failures.

Four technic C restorations developed localized marginal failure so severe that

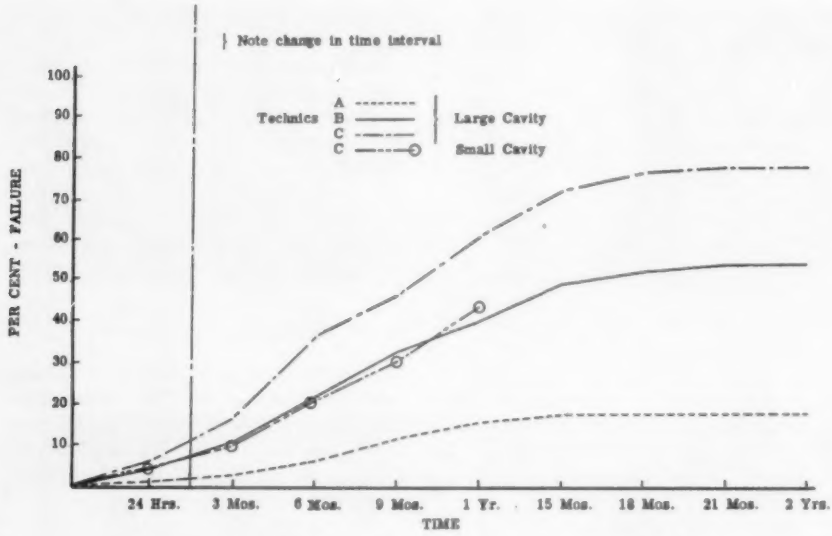

Fig. 4 • Incidence of marginal failure among amalgam restorations with varying mercury content inserted in large and small cavity preparations

replacement of the restorations was required. (These restorations were among the six that had been reported as showing "severe deterioration" in the first report.) The marginal degradation of restorations placed by technic A was slight. The failures listed for technic B were more severe than those observed in the technic A restorations, but in no instance was immediate replacement of any of the technic B restorations indicated.

There were fewer marginal failures at one year among technic C restorations inserted in the small cavity than in the larger one. The severity of these discrepancies was less than those exhibited by restorations placed by technic B in the larger cavity.

Incidence of Surface Roughness • Surface deterioration in restorations placed by technic A was negligible. Restorations placed by technic C and B exhibited a continued increase in surface roughness up to approximately 12 months (Fig. 5). The severity of the deterioration progressed only slightly after one year. Even those restorations in which surface deterioration did not appear until they had been in service for a year gave no evidence of further degradation throughout the remainder of the observation period.

The degree of deterioration observed in technic B restorations was mild; in no instance could it be classified as severe. When a technic B restoration was placed close to a badly deteriorated technic C restoration, the technic B restoration usually developed some surface roughness. Although the behavior of the restorations varied with individual patients, there seemed to be a definite tendency for restorations on one side of the mouth to deteriorate with greater rapidity than comparable restorations placed on the other side of the mouth. These observations indicate that chewing habits may play an important role in the clinical behavior of the amalgam restoration.

At the end of one year the incidence

of surface roughness was approximately 11 per cent less for technic C restorations that were placed in the small cavity than for comparable restorations inserted in the large preparation. The initial evidence of surface roughness occurred approximately three months after insertion but the amount of roughness was less in the small cavity, being comparable to that observed with the technic B restorations placed in the large cavity.

Tarnish and Corrosion • There was no difference in the number affected or in the intensity of discoloration of restorations placed by the three technics. During the two year observation, discoloration never progressed beyond a moderate stage, being characterized by a light brown stain.

Gross (Isthmus) Fracture • Only one case of gross isthmus fracture was reported during the first year of the study. This failure occurred in a technic C restoration. When the restoration was replaced by the same technic, the fracture did not recur.

In the small cavity preparation, seven restorations fractured during the one year observation period. Four fractures occurred during the first 24 hours, and one at five days. The other two fractures were observed at the time of the nine-month and one-year examinations. These fractured restorations were carefully removed and replaced by the stronger technic B restorations. However, when these restorations were examined at the end of 24 hours, all had fractured. The fractured restorations were removed, and this time they were replaced by technic A restorations. The failures again recurred. In all instances of failure an extreme traumatic occlusal relation was observed, in the form of a sharp elongated opposing cusp that penetrated deep into the restoration. A typical picture of this type

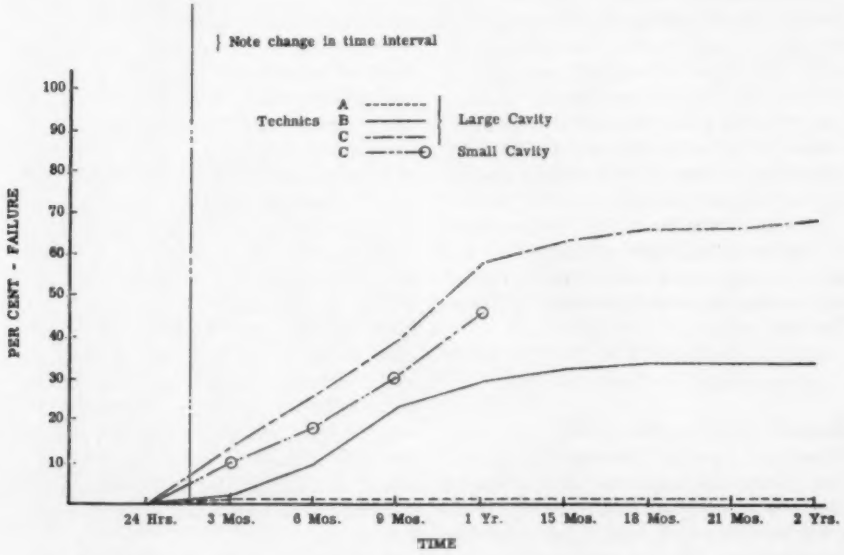

Fig. 5 • Incidence of surface roughness among amalgam restorations of varying mercury content inserted in large and small cavity preparations

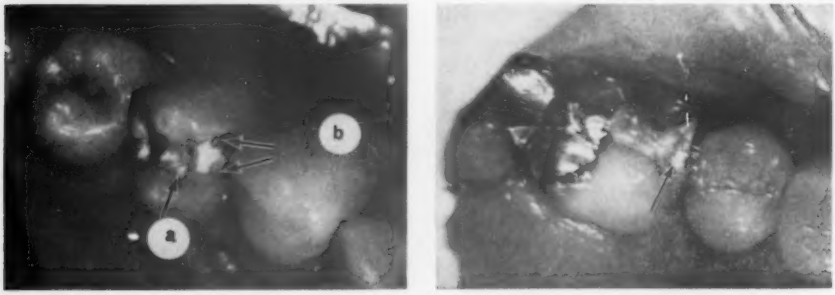

Fig. 6 • Left: Isthmus fracture in small cavity preparation. Arrow (a) points to remainder of shiny facet produced by sharp elongated cusp of opposing tooth. Arrow (b) points to material remaining in proximal retention grooves. Right: Technic C restoration replacing one that had fractured because of traumatic action of opposing sharp elongated cusp. Occlusion remains high as indicated by facet, but fracture did not recur after rounding of opposing cusp

of failure is shown in Figure 6, left. The arrow "a" points to a remainder of the shiny facet, deep into the mesial groove, which is evidence of extreme trauma. Arrow "b" points to amalgam that remained in the proximal retention grooves, indicating that there was adequate retention.

The abnormal occlusal relation was corrected by rounding the offending cusp on the opposing tooth. The restorations then were replaced with the weak technic C amalgam. No further evidence of fracture was observed during the remainder of the investigation. Figure 6, right, shows one of the technic C restorations replacing a fractured restoration after the occlusion had been corrected. A shiny facet on the marginal ridge is denoted by the arrow. Apparently the local occlusal stress was not severe enough to cause fracture.

DISCUSSION

In general, during the second year, little change occurred in the condition of the first group of restorations. Only a few of the restorations that had exhibited marginal breakdown showed signs of further deterioration; observations on surface degradation were comparable. Since the clinical significance of these findings was discussed in considerable detail in the first report and only minor changes were noted during the second year, this discussion will be primarily concerned with the effect of cavity design.

The five restorations that fractured shortly after insertion into the small cavity preparation corroborate the views of Miller[11] and Roper[12] with regard to the need for a careful study and adjustment of intercuspal relations. Even the use of the technic which produced maximum compressive strength did not prevent fracture; however, after correction of the occlusion, even the very weak technic C restoration did not fracture when placed in the same preparation. Since no early fracture occurred in the large restorations although the strength was only 13,000 psi, it might be concluded that early fractures are the result of a combination of factors, primarily severe traumatic occlusion associated with insufficient bulk of amalgam. Certainly the correction of abnormal occlusion reduces the significance of bulk. By the same token, increasing the bulk reduces the dangers of fracture when the occlusion is slightly higher.

Although intercuspal relation may be responsible for most of the fractured

amalgam restorations, it does not explain the fracture of the large technic C restoration or of the two fractures that occurred in the small cavity preparation after several months of service. Any discussion of the causes of these failures would have to be speculative. However, one possibility might be sudden biting on a small hard particle, with the resultant concentration of great stress in a small area. Also, fracture due to fatigue might have been a contributing factor. Wilkinson and Haack[13] have shown that amalgam is subject to fatigue and that the endurance level is only 22 per cent of the maximum compressive strength. Certainly the fatigue characteristics of amalgam are worthy of further investigation.

Even though the evidence seems to indicate that the low compressive strength associated with a high mercury content may not be a major factor in gross fracture of amalgam, the pernicious effects of high residual mercury were vividly demonstrated by this investigation. Both the severity and the incidence of marginal failures and surface roughening were greatest in those restorations that were high in mercury. Thus compressive strength may indirectly be a valuable physical test to evaluate the resistance of amalgam to marginal breakdown or surface deterioration.

Decreasing the buccolingual dimensions of the cavity preparation reduced the number of marginal failures approximately 19 per cent, and the surface roughness decreased by approximately 11 per cent even when the high mercury technic was employed. These findings would seem to substantiate Markley's[14] statement that marginal weakness of amalgam can be minimized by reducing the buccolingual dimensions of the cavity preparation. Bronner[15, 16] and others[17, 18] also have stated that deterioration is reduced through reduction of the area exposed to masticatory stresses.

This investigation did not define the optimum requirements for either the physical properties of amalgam or for the Class II cavity. The data obtained indicate that certain physical properties might be modified in order to improve others more pertinent to the success of the clinical restoration. For example, brittleness always has been considered one of the faults of amalgam, and in view of the observations made in this investigation it would appear that the strength requirements might be reduced if the amalgam could be made less brittle. In regard to cavity design this research would certainly suggest that increasing bulk beyond the limits originally established by Black would be superfluous and that a more conservative preparation may have definite merit.

Stress analysis studies by Mahler[19] indicate tensile stresses to be high at the occlusal surface of the amalgam restoration in cavities of conventional designs. It is hoped that future work in this area may develop a more complete understanding of the stress patterns in both the tooth and the restoration and hence a more precise definition of the requirements for the ideal cavity design.

SUMMARY

Two hundred and fifty-seven amalgam restorations were placed in cavity preparations, designed to provide extra bulk in the isthmus region. Three different manipulative procedures were employed in order to produce finished restorations of three different mercury contents (49 per cent, 58 per cent and 62 per cent), and thus restorations with three sets of physical properties. The behavior of these restorations was observed over a two year period.

Sixty-four additional restorations were inserted in conservative cavity preparations utilizing the manipulative procedure that resulted in the highest residual mercury content (62 per cent). These restorations were observed for one year.

1. No failures that could be attributed

to either flow or dimensional change were detected in restorations placed by any of the three technics in either cavity preparation.

2. One instance of gross isthmus fracture was observed during the first year with a large cavity. No other fractures were observed in this group of restorations. Seven restorations in small cavities fractured. Five of the fractures occurred early (24 hours). These fractures appeared to be the result of severe traumatic occlusion and recurred even when the technic producing the strongest amalgam was used for replacement. After adjustment of the occlusion, fracture did not recur, even with the weakest amalgam.

3. The results indicate a definite relation between marginal breakdown and the mercury content of the restoration. The most severe marginal deterioration was observed among restorations having the highest mercury content. Reduction of the cavity size resulted in a decrease in the incidence and degree of this type of failure.

4. The restorations that contained 58 and 62 per cent mercury exhibited surface roughness which was more severe in the higher mercury group. The incidence of surface roughness was lower in restorations placed in the small cavity than in the large.

5. There was no correlation between the residual mercury content of the restoration and the degree or the rate of tarnish or corrosion.

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The Value of Service • One thing I know: The only ones among you who will be really happy are those who will have sought and found how to serve. *Albert Schweitzer.*

Relation of human abnormalities of structure and function to abnormalities of the dentition III. Relation of enamel hypoplasia to epilepsy and to diagnoses associated with Rh factor

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Of 36 institutionalized patients with a diagnosis of idiopathic epilepsy, 22.22 per cent exhibited hypoplastic enamel. Of 12 institutionalized patients with a diagnosis associated with Rh incompatibility, 11 exhibited hypoplastic enamel. Further studies of larger numbers of epileptic patients should be conducted to determine the relation among seizures, hypoplastic enamel and neurological damage. The rings of hypoplasia in enamel, together with an orange discoloration of the enamel, appear to be pathognomonic of any condition that is responsible for an excess of bile pigments in the circulating blood of the newborn.

In 1950 Spitzer and Mann[1] conducted a study of congenital malformations of the eyes and teeth of mentally defective patients. They recorded anomalies of the permanent dentition only. Hypoplasia of the enamel was found to be most prevalent in patients with epilepsy. Spitzer[2] had reported previously that in 33 of 65 children with idiopathic epilepsy examined, the permanent teeth exhibited hypoplasia of the enamel.

In 1955 Forrester and Miller[3] reported a study of 13 children suffering from kernicterus. Twelve of the children developed kernicterus as the result of Rh incompatibility and one as the result of ABO incompatibility. All 13 exhibited hypoplasia of the enamel in the deciduous dentition. Nine children, prematurely born and experiencing kernicterus and cerebral palsy, also were examined. All nine children exhibited hypoplasia of the enamel. One hundred and nine presumably normal "toddlers" were examined as controls. Four instances of hypoplasia were observed in this group. Of these children, three had been born prematurely and one had congenital syphilis.

These investigators also reported a study of 99 premature children examined at the Royal National Institute for the Blind. Of the 99 children, 65 suffered from retrolental fibroplasia and 12 of them exhibited hypoplasia of the enamel. The hypoplasia was found to be most severe in three children who also had

Table • Distribution of defects of the dentition and associated oral structures for 36 patients with idiopathic epilepsy, by individual patient, institutionalized group 1958–1959*

Condition of the dentition	No.	%
Hypoplasia, incisal third†	3	8.33
Hypoplasia, middle third†	1	2.78
Hypoplasia, gingival third†	5	13.89
Hypomaturation	2	5.55
Congenitally absent teeth	1	2.78
Supernumerary teeth	0	—
Abnormal morphology	4	11.11
Abnormal texture or color	1	2.78
Edentulous	4	11.11
Other defects of the teeth	1	2.78
Normal dentition	22	61.11
Defects of associated oral structures	**No.**	**%**
Cleft lip	0	—
Cleft palate	0	—
Cleft lip and cleft palate	0	—
High palate	0	—

*Of the total, 26 had their permanent dentitions.

†The group exhibiting one or more of the three hypoplasias comprised only eight individuals (22.22 per cent, $P < .05$).

neuromuscular involvement. As controls for this study, 34 children, prematurely born, were examined in an outpatient clinic. Severe hypoplasia was reported in 7 of the 34, none of whom exhibited evidence of cerebral palsy. Twelve children experiencing cerebral palsy were examined, and in one of these children hypoplastic enamel was found. This child was born prematurely (birth weight, 3 pounds 13 ounces.) The investigators suggested that this child had experienced kernicterus of prematurity and concluded that in all such instances a diagnosis of hemolytic disease of the newborn can be made.

Watson[4] noted a peculiar ring of enamel hypoplasia in 14 of 16 patients with athetosis whose cerebral palsy was diagnosed as resulting from Rh incompatibility. Of the two without evidence of hypoplastic enamel, one had badly worn enamel and the other's condition, Watson suggested, may have been misdiagnosed as cerebral palsy resulting from Rh incompatibility.

In 1956 Perlstein and Massler[5] reported the results of an investigation of hypoplasia of the enamel and its association with kernicterus. They examined 250 children exhibiting cerebral palsy. In instances of kernicterus, associated with Rh incompatibility, hypoplasia of the enamel was reported in 58 per cent of the children. When kernicterus was associated with other factors, such as ABO incompatibility or jaundice associated with prematurity, 22 per cent of the children exhibited hypoplasia of the enamel. In instances of kernicterus not associated with Rh factor, neonatal damage was reported to be more common than prenatal damage. In instances of kernicterus associated with Rh factor, prenatal damage to the enamel was more common than neonatal damage. When hypoplasia was observed in children experiencing spastic paraplegia associated with prematurity, it was interpreted as a premature neonatal line. Of 14 children in the study who exhibited green staining of the hard tissues of the teeth, all had experienced jaundice associated with Rh factor.

In 1956 Bevis[6] identified the pigments present in liquor amnii, blood, brain and teeth in instances of hemolytic disease of the newborn. In all tissues except teeth, indirect reacting bilirubin was present. Biliverdin was the pigment identified in the dentin of a deciduous tooth. Bevis suggested that the dentin originally may have been stained with bilirubin, which later oxidized to biliverdin. According to Bevis, the concentration of pigment is usable as an index of neurological damage.

Day[7] has demonstrated that commercial bilirubin, recrystallized commercial bilirubin and serum from jaundiced infants depresses the uptake of oxygen by

the rat's brain in vitro. Day also reported that survival of newborn rats is impaired after intraperitoneal injection with bilirubin or heme.

OBSERVATIONS

Thirty-six institutionalized patients, with a diagnosis of idiopathic epilepsy, were included in the current study (Table). The hypoplasia of the enamel observed was not of the magnitude expected on the basis of Spitzer's[2] earlier observations. Spitzer reported that 50.7 per cent of 65 patients with epilepsy examined exhibited hypoplastic enamel. The current study shows that 22.22 per cent of 36 epileptic patients examined exhibited hypoplastic enamel.

The distribution of the position of the hypoplastic lesions appears of interest. The patients with epilepsy were the only diagnostic group to exhibit a higher rate of hypoplastic lesions in the gingival third (13.89 per cent) than in the incisal third (8.33 per cent) of teeth.

Further study of larger numbers of patients with idiopathic epilepsy may suggest that the hypoplastic lesions observed in this diagnostic group were primarily postnatal in origin and that they may be related to the onset of seizures per se. Such a hypothesis is temporally supported by a high rate of hypoplastic lesions in the gingival third of the permanent teeth.

The difference in the rate of hypoplastic lesions observed by Spitzer (50.7 per cent) and the rate observed in this study may have been produced by differences in severity of seizures or an improvement in the methods for controlling seizures since Spitzer's investigation in 1942.

In the current study, 11 of the 12 institutionalized patients having a diagnosis associated with Rh factor exhibited hypoplastic enamel. Of eight patients who had deciduous incisors present, all exhibited hypoplasia of the enamel of the deciduous dentition. Figures 1-7 depict teeth of six of these eight subjects. In each instance a complete ring of hypoplastic enamel was observed in the area which has been interpreted as neonatal. The patient in Figure 1 showed considerable diminution in the thickness of the enamel in the area interpreted as prenatal, accompanied by an orange discoloration. In Figure 2 no great diminution of the size of the crown was noted in the prenatal enamel, but staining was more severe in the prenatal and neonatal areas. Figure 3, a photomicrograph of a tooth shown in Figure 2, shows more normal enamel formed in the postnatal and posttransfusion period.

Figure 4, left, represents a somewhat exceptional subject with poor formation of the enamel in both the prenatal and the postnatal periods, accompanied by generalized discoloration of the enamel. There was no history of transfusion in this instance. In Figure 4, right, and Figure 5, the characteristic ring of hypoplasia was consistently observed.

The findings for the group with Rh incompatibility support the hypothesis of Day,[7] which suggests that damage to cells is caused in some way by the deposition of bilirubin. The presence of the complete ring of hypoplasia observed in each instance suggests that the damage was caused by an excess of some noxious substance. The ringlike pattern of hypoplasia for this group was noticeably different from the pattern observed in the group born prematurely discussed in Part I of this series. In the premature group only those portions of the teeth supplied by the more terminal capillary beds were affected. These labial and buccal regions also experience more pressure of eruption, suggesting that a deficiency of some essential metabolite might be responsible for the hypoplasia in infants born prematurely.

The diminution of prenatal enamel thickness as illustrated in Figure 1 indicates that the ameloblasts had died prior to completing their normal life cycle. In the area interpreted as neonatal, prac-

Fig. 1 • Case 1. Hypoplastic lesions in midincisal third of deciduous cuspids and mandibular lateral incisors of white boy, age 7 years 6 months. Mandibular deciduous central incisors show orange discoloration. Enamel gingival to lesions appears normal, as does maxillary permanent incisor. Birth had been at full term. Medical diagnosis was erythroblastosis fetalis, spastic paraplegia

Fig. 2 • Case 2. Hypoplastic lesions in middle third, incisal third and occlusal third of deciduous dentition of white boy age 3. Weight at birth had been 6 pounds. Medical diagnosis was erythroblastosis fetalis. Child had been given transfusion of blood in neonatal period

Fig. 3 • Photomicrograph of deciduous mandibular cuspid shown in Figure 2. Note that hypoplastic defect is coincident with neonatal line. Note also marked degree of prenatal pigmentation of enamel with more normal enamel appearing in postnatal and posttransfusion areas

Fig. 4 • Left: Case 3. Teeth of white girl age 6 years 1 month. Maxillary central incisors appear of normal labiolingual thickness in incisal third; gingivally, labiolingual diminution is shown; all teeth are considerably worn and discolored by orange pigment. Birth had been at full term. Medical diagnosis was erythroblastosis fetalis, light spastic quadriplegia. No record of transfusion was in available history

Right: Case 4. Teeth of white boy age 7 years 6 months. Hypoplastic lesions with orange discoloration in incisal third of anterior teeth, and orange discoloration in gingival third of maxillary incisors. Weight at birth was 7 pounds 10½ ounces. Medical diagnosis was mental deficiency, undifferentiated, possibly erythroblastosis

Fig. 5 • Left: Case 5. Teeth of white girl age 7 years 6 months. Hypoplastic lesions with orange discoloration in middle third of mandibular deciduous lateral incisors, cuspids and first molars and in occlusal third of mandibular deciduous second molars. Maxillary deciduous teeth show noticeable wear. Birth had been at full term. Medical diagnosis was erythroblastosis fetalis with kernicterus

Right: Case 6. Teeth of white girl age 7 years 6 months. Hypoplastic lesions with orange discoloration in middle third of mandibular deciduous lateral incisors, cuspids and first molars and in occlusal third of mandibular second deciduous molars. Maxillary teeth show considerable wear. Birth had been at full term. Medical diagnosis was erythroblastosis with kernicterus

tically no enamel was formed. In Figure 2 there was little or no diminution of the size of the crown formed during the prenatal period but there was considerable discoloration of the enamel. Such a pattern suggests that lower concentrations of bilirubin result in a discoloration and poor formation of a normal amount of enamel. At higher concentrations, death of the ameloblast occurs before the normal length of the enamel rod is achieved or before any amelogenesis has occurred.

SUMMARY AND CONCLUSIONS

Thirty-six institutionalized patients with a diagnosis of idiopathic epilepsy and 12 institutionalized patients with a diagnosis associated with Rh incompatibility were studied in regard to abnormalities of the dentition.

The following conclusions were reached:

1. Further studies of larger numbers of epileptic patients should be conducted to determine the relation among seizures, hypoplastic enamel and neurological damage.

2. The rings of hypoplasia, in conjunction with an orange discoloration of the enamel, appear to be pathognomonic of any condition that is responsible for an excess of bile pigments in the circulating blood of the newborn.

3. Further studies should be conducted on children with diagnoses associated with Rh factor who exhibit no neurological damage, to determine whether or not pigmentation predominates in hypoplastic enamel. *Box 8*

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Ethical Problems • The ethical problems posed by the utilization of knowledge are, of course, as old as mankind. But it is only during modern times that the question has become practically important as a result of the increasing effectiveness of scientific methods, and of the fact that science is now valued more for its social uses than as natural philosophy. In a recent address, Ritchie Calder stated that "scientists leave their discoveries like foundlings on the doorstep of society. The step-parents do not know how to bring them up." Clearly, this attitude is no longer permissible now that scientific discoveries can have such far-reaching and lasting effects on human existence—indeed, on the fate of the human race. It is for society, of course, to decide what goals it wishes to reach and what risks it is willing to take. But it is the task of the scientific community to formulate as clearly as possible and to make public the probable consequences of any step that it takes and of any action that it advocates. In other words, the responsibility of the scientist does not stop when he has developed the knowledge and techniques that lead to a process or a product. Beyond that, he must secure and make public the kind of information on which the social body as a whole can base the value judgments that alone will decide long-range policies. ***René Dubos. The Dream of Reason. Horizon 3:4 July 1961.***

A study of the need for periodontal treatment in a group of naval personnel with a comparison of periodontal indices

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The incidence of periodontal disease and the need for periodontal treatment were evaluated in 1,209 enlisted men. The Ray Index of Periodontal Disease was used. Of those examined, 945 needed only careful mouth hygiene and 175 needed treatment by a dental officer with experience and training in periodontology. The need for periodontal treatment increased with age. The incidence of advanced periodontal disease is higher than has been previously recognized. This disease starts at a much younger age than is generally believed.

Periodontal disease is a major disease of the oral cavity and consequently a major responsibility of the dental profession. Early recognition of damage to the periodontium and its treatment, both in the prevention of further destruction and the clinical control of the disease process, have their impact on the public and its health problem as well as on the responsibility of the dentist. Only recently interest and emphasis have been placed on surveying the incidence and epidemiology of this condition to bring the magnitude of this problem within the cognizance of those rendering oral treatment.

The advancement of technics and therapeutic measures in the protection of teeth against the ravages of caries has occurred at a rate commensurate with medical progress. For some inexplicable reason the same recognition of a comparable progress has not been manifest in the direction of periodontal disease. Substantial advances in research in the direction of understanding the histopathology as well as the etiology of the diseases of the periodontium have been on a par with those in the understanding of caries. The therapeutic technics in control of this malady, although still empirical in a sense, are no more so than those which adequately protect and restore the teeth damaged by caries. The general practitioner of dentistry has unfortunately neglected the adequate evaluation of periodontal diagnosis as well as therapy. This neglect is consequently manifested in organized dental groups committed to improving the oral and general health of large numbers of the population.

Armed Forces dental departments are primarily geared to the restoration of individual teeth and missing teeth, and only now has the impact of periodontal ther-

apy, ancillary and necessary to restorative therapy, begun to have its proper place in programming. In any large public health venture, which would include the health services rendered by both the medical and dental corps of our Armed Services, one must direct one's attention to all phases of disease which jeopardize the over-all health picture of the individual. This is not only a practical approach from the economic standpoint but also one of efficiency in treating and caring for the individual patients.

Whereas it is very difficult to substantiate and to prove scientifically any inroad on the general health from toxic absorption from the lesions of periodontal disease, it is a distinct clinical impression among those who are familiar with its therapy that the general health and well-being of the patient is enhanced after successful periodontal treatment even when the treatment includes the extraction of hopelessly involved teeth. Studies in bacteremia and toxic absorption are now going forward in many research centers and further evidence in this respect will be forthcoming. Clinical impressions, however, have some validity when one also considers that the disease itself is responsible for the loss of at least as many, if not more, teeth as caries is.

One of the outstanding correlations made as a result of the incidence studies to date is that of age. It is generally established that as the age increases the extent and severity of periodontal disease increases. This is true not only of severity in the individual but also of an increase in the number of people afflicted.[1-17] It is not generally understood that periodontal disease can start very early in life and have manifestations which are well within the realm of control and treatment depending entirely on an early and a more accurate and intelligent diagnosis.

The periodontal work load in the dental department of the Naval Station at Treasure Island in San Francisco stimulated us to make a study of a definite group in an attempt to evaluate the incidence of periodontal disease and the caliber of treatment required to control it. To this end and purpose the following study is reported in an attempt to point up the need for more extensive recognition of periodontal disease and its treatment within the over-all dental responsibility and particularly in dental services directed toward a specific group, such as enlisted personnel presenting themselves for examination at this station.

REVIEW OF LITERATURE

There have been many epidemiologic studies on gingivitis and gingival involvements, many of which were carried out on children and adolescents. Reports of numerous studies appear that have been done on people from all over the world.[12]

Studies that attempt to correlate the incidence of gingivitis with caries incidence have been reported.[3-6] Correlation of factors, other than caries, with gingivitis have also been reported.[5-8, 14, 15] Certain civilian and military populations in this country have been studied establishing the prevalence and incidence of gingival disease.[4-6, 9-12]

The reports of studies on the prevalence and incidence of frank periodontal disease are in the minority. The first of these reports in this country was made by Black[13] in 1918, and more recently by others.[3, 16-19]

All of these studies, even those using the PMA index of Massler and Schour[20, 21] and the system described by Russell,[22] were primarily to show the prevalence and incidence of periodontal disease. Other than the reports of Cross[23] there are very few reports of studies on the severity and need for periodontal therapy in a selected group of subjects.

MATERIALS AND METHODS

The dental department at the Naval Station at Treasure Island has, as one of its

responsibilities, the task of making a dental examination for the groups of students who were assigned to the Electronics School at this activity to avert any dental emergencies while they are attending the school. This examination was conducted without interfering with any of the routine procedures of the students' education. Consequently this group was selected for study since they represented a good sampling of a large group of technically trained enlisted personnel in the Naval service.

The resident in the periodontal residency program at this installation was schooled in making a periodontal evaluation from the epidemiologic standpoint by Dr. A. L. Russell of the National Institute of Health. The examination included a charting of the existing carious lesions and an examination of the periodontal condition of the patient. This was done in the examining facility of the dental department and conducted with the accepted equipment for this procedure. As a result of this examination the patients were placed in four classes:

Class I—all individuals who were free from clinical periodontal disease, including gingivitis, and for whom only careful mouth hygiene, executed by auxiliary personnel, was necessary.

Class II—individuals with clinically demonstrable mild periodontal disease, including gingivitis, and who, in the opinion of the examiner, were within the province of a dental officer without special training in periodontology.

Class III—individuals with demonstrable moderate to severe periodontal disease as evidenced by clinical pockets, mobility of teeth, or both, and whose treatment should be relegated to a dental officer with special training in periodontology and experience in determining the extent and feasibility of treatment.

Class IV—individuals who, as determined by careful interrogation, had lost teeth as a result of periodontal disease or in whom the severity of the disease process present was such that, in the opinion of the examiner, extraction was the only treatment indicated.

The symbol 0 was used to include all individuals in this group with complete dentures whose loss of teeth was due to pathology other than periodontal disease. The cause of the loss of teeth was determined after careful interrogation of the patient. The examinees were sent to the dental department from the school command, in several groups of 19 or 20 each, on a specific day of the week. They were examined periodontally and their age, area of longest residence and years of formal education were elicited.

A careful chart of the pertinent data was made at the time of the examination. In order to check the validity of ascribing these patients to the afore-mentioned periodontal classes, every tenth examinee was reappointed for a more thorough periodontal examination on the next day. Those selected were immediately sent to the x-ray department for full mouth roentgenograms. At the subsequent appointment members of this selected group were re-examined by the periodontal resident and the civilian consultant, who applied to them an index for periodontal disease devised by Dr. Harold G. Ray of the University of California and used in the pedagogy at the division of periodontology at that institution. This periodontal index, which will be referred to as the Ray Index, was devised primarily as an aid in pedagogy and was used here to determine its validity in an epidemiologic study, and to corroborate the results of the resident's examination.

The Ray Index is determined by using both objective and subjective findings in the following manner. A chart such as illustrated in Figure 1 is used in the procedure and each interseptal space of the examinee is evaluated. An acceptable periodontometer is used to measure the depths of the sulcus or pocket on the mesial and distal surface of every tooth. This measurement is recorded on the

PERIODONTAL INDEX

PATIENT'S NAME AGE SEX RACE

RIGHT POCKET AND RESORPTION RECORD LEFT

R		3		1		3		3		3		3		1		0		3		1		5		3		3		5		3		R
P	6		6		4		4	7	5	6	2	4	5	4	5	4	4	3	3	5	6	4	4	8	6	6	5	5	6	8	8	6	4	P
T	8		7		6		5		4		3		2		1		1		2		3		4		5		6		7		8	T
IND		15		9		15		9		12		12		9		6		14		9		19		14		14		21		13		IND
IND																																IND
T	H		G		F		E		D		C		B		A		A		B		C		D		E		F		G		H	T
P																																P
R																																R

R = ALVEOLAR RESORPTION:
0 = LAMINA DURA INTACT
1 = SLIGHT 3 = MODERATE 5 = SEVERE
P = MEASUREMENT OF POCKET DEPTH IN MM
T = TEETH – UPPERS NUMBERED, LOWERS LETTERED
IND = PERIODONTAL DISEASE INDEX = SUM OF POCKET DEPTHS & RESORPTION LEVEL

PERIODONTAL INDEX – UPPER –
LOWER –
TOTAL –

Figure 1 • Chart illustrating the recording of pocket depths and alveolar resorption and the resultant periodontal index of severity

appropriate side of the square which is ascribed to each tooth. The upper teeth are numbered from 1 to 8 on each side of the midline and the lower teeth are lettered in the lower part of the chart. After a numerical evaluation of the depth of the sulci or pockets is made and recorded for every tooth present, an evaluation of the resorption level is made for each interseptal space by observation of the alveolar bone loss as seen in roentgenograms taken previously (Fig. 2). A numerical value of the extent of resorption is ascribed to the alveolar bone concerned with each interseptal space and recorded in the square designated by R which brackets the two teeth concerned with that interseptal space. The resorption values are designated as follows:

0 or no marking in this R square indicates that the corticalis (lamina dura) of the alveolar crest in the interseptal space is intact at any particular level. This infers that from the reading of the roentgenogram no active resorption is taking place in the specific interseptal space.

The value of 1 is used to designate a break in the crestal interseptal corticalis (lamina dura) and is interpreted as beginning resorption.

The value 3 is used to designate active resorption which has involved approximately ⅓ of the supporting bone subjectively determined according to the age of the patient.

The value 5 is assessed for severe resorption of alveolar bone beyond the previous designation of 3.

When the evaluation of the resorption level has been determined and recorded on the chart, each interseptal space presents two sulci or pocket depth measurements, one, the distal of the mesial tooth, and the other, the mesial of the distal tooth, and an evaluation of the resorption level. These two pocket measurements and the resorption level figure are added together. This sum becomes the index for that interseptal space. Thus, if on the distal of the upper right lateral or R2 the pocket measurement is 5 and on the mesial of the upper right cuspid, or R3, it is 4 and the resorption level has had an assessment of 3, as indicated on the square above bracketing the space, the index for that interseptal space is 12. This index is placed in the square below the interseptal space for the upper teeth and above for the lower teeth. The successive indices are then added for the upper and

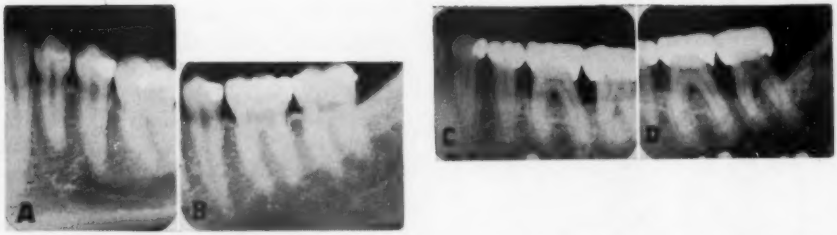

Figure 2, A-D • The corticalis (lamina dura) of the crest in the interseptal space is intact at any level in these roentgenograms. This infers that no active resorption is taking place. Designated as a resorption value of 0

Figure 2, E-H • A break in the crestal interseptal corticalis (lamina dura) is seen in these roentgenograms. It is interpreted as beginning of resorption. Designated as a resorption value of 1

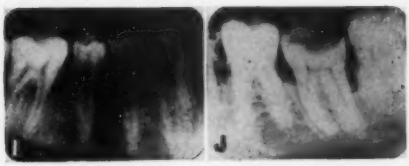

Figure 2, I and J • Active resorption which involves 1/3 of the supporting bone. It is subjectively determined according to the age of the patient. Designated as a resorption value of 3

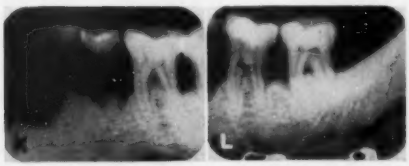

Figure 2, K and L • Severe resorption of alveolar bone beyond that seen in I and J is seen in these roentgenograms. Designated as a resorption value of 5

divided by the number of interseptal spaces evaluated and an index for the upper arch is found. Similarly, this is done for the lower arch. The two arch indices are added together and divided by two for the average index of the patient.

The Ray Index does very well for instances of periodontitis with rather universal disease severity and is used effectively as a means of communication between instructor and student and between practitioners. For example, a patient with an index of 2 to 4 conforms to the normal periodontal finding, whereas indices of 10 to 15 indicate moderate to severe periodontal disease. Twenty or above indicates a high degree of severity. This index also can be used to designate a deviation from generalized periodontal disease or to indicate sporadic periodontal lesions such as those found in the periodontosis syndrome. This is accomplished in the following manner: when it is ascertained, after

Table 1 • Classification according to age

Age in years	Total	0	Class			
			I	II	III	IV
17	73		60	8	5	
18	471		387	59	24	1
19	261		216	35	10	
20	105		94	8	3	
21	52		40	11	1	
22	37		29	7	1	
23	20	1	11	7		1
24	26	1	18	5	2	
25	12		9	2	1	
26	17	1	10	2	4	
27	25		19	4	1	1
28	23	1	13	4	5	
29	11		7		3	1
30	26		11	7	6	2
31	12		8	2	1	1
32	17		9	5	3	
33	8		2	3	2	1
34	4			3	1	
35	3				3	
36	2		1		1	
38	2			2		
39	1		1			
45	1		1			
Total	1,209	4	945	175	77	8

evaluation of a completed chart, that some interseptal spaces present high indices whereas, for the most part, the remaining interseptal spaces present low indices, the procedure followed is to add all of the disparaging indices and determine the average. The average is then applied to each separate index and the deviation from it, either plus or minus, is recorded. The deviations are then added and divided by the total number of interseptal indices. An average deviation is arrived at and the index is then written—the average index plus or minus the deviation. This immediately alerts the observer to the fact that the disease is not generalized but is more severe in some specific areas than others. For example, if a patient has an index of 10 to 15 in approximately 6 interseptal spaces, and the remaining interseptal spaces present an index of 4, 5 or 6, this would result in a mean index of 9 plus or minus 4 which would mean that some of the interseptal spaces were found to have indices of 13 or more and others were within the range of 5.

The Ray Index has a great deal of value pedagogically with the undergraduate student since it points up the close relation of clinical examination and proper roentgenologic interpretation in the formation of diagnostic judgment and treatment plan. It has some validity as the findings will show in corroborating the less exacting technics which have to be used epidemiologically since the facility for roentgenographic examination is neither feasible nor practical in the studies of mass populations.

In the more exacting examination of the selected group of students, additional information was elicited. For this smaller group of patients, in addition to the afore-mentioned information, the educational class standing for each individual and his hereditary background were determined by questioning him. The findings were correlated and tabulated by I.B.M. cards according to certain categories.

FINDINGS

During a six month period 1,209 enlisted men were examined. These subjects came from all of the 50 states and ranged in age from 17 to 45 years. The pertinent data elicited from the study are demonstrated in Table 1. Nine hundred forty-five of the 1,209 men were in Class I. They needed only an oral prophylaxis. One hundred seventy-five needed attention from a dental officer for mild periodontal disease, and 77 required treatment by a dental officer with experience and training in periodontology. Of the total number, eight were edentulous, presumably as a result of periodontal disease. If a generalization can be made of this group it could be assumed that about one man in seven (14.5 per cent plus or minus 1.01 per cent) will require periodontal treatment from a dental officer on admission and that 1 man in 14 (7.0 per cent

plus or minus .73 per cent) will require treatment from an officer with specific training in periodontal therapy.

As can be noted in the evaluation of age in relation to the requirement of periodontal therapy, there is a consistent increase in the older age group as found in other studies. Of the 544 who were 18 years and younger, 447 or 80.6 per cent were in Class I; 67, or 12.3 per cent, were in Class II; 29, or 5.3 per cent, were in Class III; and 1, or 0.2 per cent were in Class IV. Of the 665 who were 19 years of age and older, 498, or 74.9 per cent, were in Class I; 108, or 16.2 per cent, were in Class II; 48, or 7.2 per cent in Class III; and 7, or 1 per cent, were in Class IV.

One tenth, or 120, of the individuals who were re-appointed to be examined by the resident and the civilian consultant and to whom the Ray Index was applied demonstrated the same general trend. Table 2 demonstrates the index numbers correlated with the class designations according to need for treatment. It was noted that the greatest number, 91, had an index of 2, 3 and 4 and that 83 of these were in the treatment need of Class I. Eight were in the treatment need of Class II. This is consistent with clinical experience. Whereas the index numbers 2, 3 and 4 suggest a clinical absence of periodontal disease, the indices of 3 and 4 might indicate, or be consistent with, a chronic gingivitis and therefore require professional care. This is particularly true when considered in the direction of the prevention of future disease.

In the remainder of this selected group the periodontal index was found to range from 5 to 9 and included 29 persons. Only four of these, with an index of 5, needed the treatment designated by Class I, 14 needed that indicated by Class II and 11 needed the treatment of a periodontist. This is consistent with the accumulated knowledge of the use of this index which interprets ranges from 6 to 9 representing moderate to severe periodontal disease. There is, therefore, a good relation between the Ray Index and the indicated need for a type of treatment as assessed by the resident. It should also be noted that the classification, according to need for treatment, reflects only present need for treatment whereas the Ray Index necessarily includes factors which reflect past experience on the patient's part with the disease.

Table 2 • Index numbers correlated according to need for treatment

Index number	Total	0	Class			
			I	II	III	IV
2	25		24	1		
3	37		34	3		
4	29		25	4		
5	15		4	9	2	
6	10			4	6	
7	1				1	
8	2			1	1	
9	1				1	
Total	120		87	22	11	

This corroboration is more graphically illustrated in Figure 3 where 0 is ascribed to Class I, 1 to Class II and 2 to Class III. Here it will be noted that the graph line stays in a horizontal position until index 4 is reached and then rises definitely as the index increases. This would seem to give validity to the solely objective examination prosecuted on the large number of individuals examined by the resident. In Table 3 comparisons are made between the findings using the periodontal index in the smaller group and assessing a mean classification score and those of the larger group with the same device. It will be noted that the small group was not particularly typical of the larger samples in persons aged 19 years and older. In the larger group these men average more than a year older and their treatment needs are 0.34 which is considerably less than 0.48. This is a point of no great importance but might suggest that the schedule of "every tenth" reappointment was not followed rigidly or

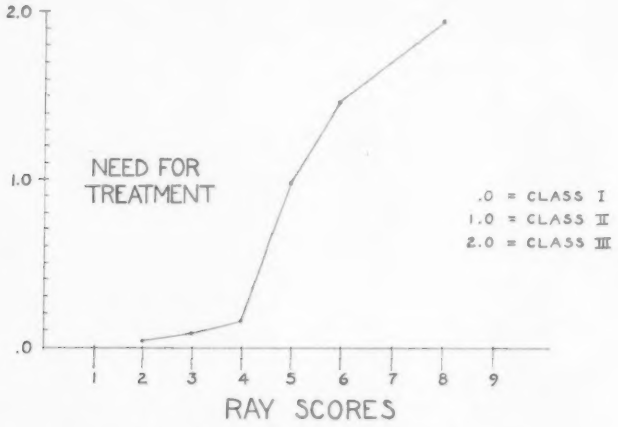

Figure 3 • Relation of Ray Index to need for treatment

that reappointment on a true random pattern might have given a better sub sample. On the other hand it can reflect the greater accuracy of the Ray Periodontal Index in evaluating the true nature of the extent of the disease process.

Table 4 shows the findings in respect to formal education, which illustrates a difference in the expected direction.[12] This would appear to be true despite the preponderance of men with 12 years of schooling. It will be noted that in each of the classes the number and percentages decrease as the number of years of schooling increase. A similar finding with the small group was determined with the class standing. There was a tendency to disregard this latter finding, however, since a more accurate study in relation to education is needed to confirm or deny it.

No significant difference in data was observed when analyses were made of the apparent ancestry of the examinees. More accurate studies of ancestral influence should be made to determine the relation of genetics, the socioeconomic status of the individuals, or both. It is our understanding that certain ethnic studies are now being made and we feel that investigations along this line should be encouraged.

Table 3 • Age significance of large and small group

Age	Mean age	N	Mean score
	Small group		
18 & younger	18.4	58	.24
19 & older	21.5	62	.48
All ages		120	.37
	Large group		
18 & younger	18.4	544	.24
19 & older	22.8	665	.34
All ages		1,209	.29

Table 4 • Relation of education to need for treatment

Years education	N	Class			
		I	II	III	IV
11 or less	186	127 68.3%	35 18.8%	21 11.3%	3 1.6%
12	873	695 79.6%	119 13.6%	51 5.8%	4 0.5%
13 or more	150	123 82%	21 14%	5 3.3%	1 0.7%

The data compiled in respect to geographic origin were difficult to analyze since no significant finding seemed to be evident. Table 5 shows the examinees divided into regions and the mean classification score for both the sub sample and the whole group. This would lend some support for a belief that there are significant regional differences in need for treatment in the whole group. This division into regions was made without study of individual state scores. This may have obscured important and real regional differences and realignment by region on a more rational basis may disclose consistent differences more impressive than these.

Table 5 • Relation of geographic distribution by regions

Region	Small group		Large group	
	N	Mean	N	Mean
Northeast	17	.53	152	.33
North central	51	.33	401	.28
South	14	.46	214	.34
Rocky mountain-Southwest	16	.38	177	.37
Pacific Coast	22	.23	257	.20

DISCUSSION

This report can serve as a template for an analysis of treatment requirements and points out the need for trained personnel in the field of periodontics. Early and adequate recognition and treatment will unquestionably reduce the future load of prosthetic responsibility.

The often expressed opinion that we must be concerned with periodontal involvements only after the patient reaches 40 years of age apparently has no validity. There is obviously a larger number of patients per capita with advanced periodontal disease than has been previously recognized. It is also apparent that this disease starts at a much younger age than was generally believed. The resolution of disease processes of the periodontium will require a greater emphasis in respect to periodontal training of the general practitioner. This is axiomatic if our objective is to be the perpetual preservation of what remains rather than the meticulous restoration of what is missing.

SUMMARY

Over a period of six months 1,209 enlisted men entering the electronics school at the U. S. Naval Station, Treasure Island, were examined and classified according to their need for periodontal treatment. These men came from all of the 50 states. They ranged in age from 17 to 45 years and had formal education of from 4 to 16 years. For every tenth man, or 120 men, full mouth roentgenograms were taken. These men were reexamined and the Ray Index of Periodontal Disease was applied to them. The findings are summarized as follows:

1. Nine hundred forty five men needed only careful mouth hygiene, 175 men needed treatment by a dental officer with experience and training in periodontology. Eight men were edentulous, presumably as a result of periodontal disease.
2. As the age increased there was a consistent increase in periodontal treatment needed.
3. There seemed to be a decrease in periodontal treatment needed as the years of formal education increased. However, a more accurate study in relation to education is needed to confirm this finding.
4. The data compiled in respect to geographic origin might lend some support to a belief that there may be significant regional differences in need for treatment. However, much more work should be done along this line.
5. There was a good relation between the classification by need for treatment and the Ray Index of Periodontal Disease.

This study was done in partial fulfillment of the requirements of the residency program in periodontics. The two indices utilized were the Russell for mass evaluation and the Ray for more specific delineation of periodontal severity.

The opinions or assertions contained in this article are the private ones of the writers and are not to be construed as official or reflecting the views of the Navy Department or of the naval service at large.

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Human Welfare • In the final analysis, any deep-seated arguments about scientific matters are usually attributable to an area of ignorance which can be, and usually is resolved when subjected to adequate study and supported by adequate evidence. In the field of health, you have the additional satisfaction of seeing your knowledge applied to the welfare of your fellow man to which this country is continuing to make such significant contributions, both individually and collectively, at a time when our healing shots in the arm may not seem as spectacular as the dramatic shots into space. *Reidar F. Sognnaes, Predicaments of Specialization in an Adaptive Civilization, 1961.*

'Seed planting' in dentistry

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Every dentist has within his practice patients whose ultimate treatment should be preceded by a program of "seed planting"—education and suggestion as part of a treatment plan based on concern for the total oral health of the patient. Both basic and optimum dental health plans are presented. This low-pressure approach gradually leads to optimum dentistry for many patients.

Every dentist has within his practice many patients whose ultimate treatment should be preceded by a program of dental "seed planting." The term seed planting has been chosen because it adequately expresses the approach suggested by this paper to treatment planning and presentation in many instances. It involves more than casualness or subtle suggestions to the patient that he have certain treatment accomplished someday. It involves more than dental education in a general way. In other words, it goes far beyond throwing the seeds on the ground. This philosophy employs education and suggestion as part of a definite treatment plan based completely on genuine concern for the total mouth health of the patient. For this group of patients, a sound basic dental service combined with an adequate recall system would be sufficient to postpone for one to three years the extensive restorative treatment required to meet the standards of optimum dental health.

It should be apparent at this point that it will be not only helpful but also necessary to differentiate between basic and optimum dental health as far as this paper is concerned. Basic dental health service may be defined as that dentistry primarily concerned with individual tooth restoration. Patients who have received only basic dentistry would normally exhibit: (1) large fillings instead of inlays and crowns; (2) one or more missing posterior teeth; (3) replacement of anterior teeth, usually with a removable appliance; (4) a tendency to have teeth with pulpal involvement removed rather than treated; and (5) a tendency to have badly broken-down teeth removed rather than restored.

Even a basic program should, of course, include root canal treatments and crowns, when necessary, to save individual teeth. Unfortunately, there are many patients who have been receiving far less than even basic dentistry as defined here.

Optimum dental health service may be defined as that dentistry which employs sound treatment procedures and technics in the prevention of dental disease as well as in repairing past damage. Treatment is directed toward total mouth health.

OPTIMUM DEFERRED TREATMENT

It would be appropriate at this juncture to state categorically that the practice of presenting basic and optimum programs to patients has done more for the author as far as treatment planning and presentation is concerned than would be possible to relate in this article. Patients understand this approach and this understanding is important. The value of presenting basic and optimum programs to patients goes far beyond terminology. This approach is a philosophy within itself. It affords the opportunity of showing genuine concern for the total mouth health of the patient without having him feel that his mouth is going to be neglected if it is desirable to proceed with only basic dentistry at this time. This treatment plan is accomplished many times by presenting portions of the treatment as "optimum deferred." For example, if a patient has had a missing posterior tooth for twenty years with very little or no damage as a result, why have him feel he must have that bridge next week or month?

Plant the seeds first for greater patient reception later rather than "selling" him now. This principle reduces to the absolute minimum any discussion of materials and is immeasurably better than offering the patient a choice of "good—better—best," or such terminology as "recommended — alternative — emergency." When using such relative degrees of wording, emphasis on material and fees cannot be avoided. The patient is given three paths to follow and given the responsibility of choice. If he chooses less than the best he feels he has chosen something inferior when the basis for decision has been primarily on cost and materials. In the approach suggested here, there is but one path, one goal and that is total mouth health. In certain instances the patient may influence the speed taken on the path; but, with proper diagnosis, treatment planning and seed planting, the goal will remain the same.

Patients who can benefit from a planned program of education and seed planting will normally be adults from 25 to 60 years of age who have been seeing a dentist with reasonable regularity. They will normally be patients who have been receiving various degrees of basic dentistry and do not show complete neglect of their mouths.

No effort will be made to enumerate all the conditions that might properly be classified as basic dentistry but a few obvious conditions that lend themselves most advantageously to seed planting and thus to optimum dentistry are: (1) an anterior tooth that has been weakened with repeated silicate fillings and will need a jacket crown in the near future; (2) a missing anterior tooth that has been replaced with a removable plastic partial and should have a fixed replacement; (3) a malaligned tooth that should be extracted and replaced; (4) posterior teeth weakened with silver fillings, or inlays, that should have the external support of a crown to prevent fracture; (5) replacement of missing posterior teeth; (6) signs of abnormal wear and facets on teeth suggesting need of occlusal equilibration; (7) early objective signs of a periodontal disturbance; (8) early signs of third molar affecting periodontal health of second molar; (9) wear on crowns caused by clasps of partial dentures: (10) any combination of these conditions where correction and treatment might properly be classified as complete mouth rehabilitation.

LOW-PRESSURE APPROACH

Patients who need treatment will value the treatment more if their dental IQ is raised to the point where there is a complete understanding of the reason for the treatment. What a pleasure it is to have patients you have personally edu-

cated who now have explicit confidence in you and your ability. Compare these patients to the one who has reluctantly accepted a rehabilitation program from you after the first visit. The patient whose dental IQ has been raised will also follow through with home care more effectively and thus your treatment will be more of a service to the patient. How unfortunate it is to see a patient with extensive restorations who has neither been taught to care for his mouth at home nor been impressed with the need for home care.

With proper selection, the aforementioned patients will respond to a "low-pressure" approach gradually leading to optimum dentistry. Low pressure is necessary because many of these patients could be expected to offer some resistance at first to suggestions for an extensive rehabilitation program.

This resistance would be fostered actually by a defense mechanism on the part of the patient, for this new dentist has told him, in effect, that his mouth has been neglected when all the time he has been receiving what he thought was good dental care. Mouths do not fall apart in a short time. Conversely, and consistent with the principle that no treatment is to be delayed that is needed now, frequently there are dental conditions of the afore-mentioned type that can wait one, two or three years before extensive treatment is accomplished. It is during this period that the dentist begins to educate the patient and plant the seeds that may not be ready for harvesting until three years hence.

The dental IQ of the patient is but one of several reasons why some delay in treatment may be desirable, thus allowing more time for seed planting and education, when necessary. Besides the dental IQ, these factors may influence the treatment plan: (1) health of patient, (2) dental condition requiring further time for sound diagnosis and prognosis, (3) availability of patient for appointments, (4) appointment schedule of the dentist and (5) economics.

Recall again the type of patient being discussed and recognize that often the patient thinks he has been receiving optimum dentistry but he has not been. Even in diagnosis the low-pressure approach for patient management is useful in gaining the confidence and respect of patients. For example, assume a patient has called for a routine examination. There is no discomfort or problem, as far as he is concerned. Visual examination reveals average home care, no cavities and slight calculus. The patient states that only an occasional single roentgenogram has been made. Apparently the only treatment indicated is prophylaxis. Bitewing roentgenograms and perhaps one or two single roentgenograms to check a particular tooth are taken at the first appointment. Because of the absence of visual pathology, a complete mouth survey may not be taken. Then, at the time of the prophylaxis appointment when the bitewing roentgenograms are in view of the patient, the seed may be planted for a complete roentgenographic examination for the next appointment. Some reference may be given to what can be seen and the statement made that sooner or later it will be best to look at the roots of all the teeth.

Remember that the afore-mentioned patient is one who needs to be dentally educated with patience. He is one of a large group of patients who for one or more reasons change their dentist but nevertheless are of the opinion they have been receiving at least adequate dentistry, until persuaded otherwise. It should be stated that no hesitation is used in taking complete mouth roentgenograms on a patient who presents the obvious need. There will be a high percentage of new patients in this group, patients who cannot wait for seed planting to satisfy the requirements for total mouth health. Many patients will need a different type

of dentistry than they have been getting and they will need it now. The treatment plan for such patients will still involve basic and optimum dentistry, but the basic program is discussed only for the purpose of having patients completely understand the difference between the basic program and the optimum dental health service they need.

SUMMARY

A philosophy has been presented that makes an appeal for patient education and preparation for optimum dentistry. This preparation could vary to care for the needs of a patient who needs extensive rehabilitation treatment involving numerous crowns and replacements to the patient who should be prepared for a single anterior jacket crown on a tooth weakened by repeated silicate fillings. This principle permits a presentation based completely on the requirements for total mouth health consistent with a genuine concern for the health of the whole patient.

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Science and Society • The relation of science to society has changed and become more complex during modern times. Three hundred years ago Bacon and his followers were justified in claiming that the important problem was to learn how to do things. There was then so little that could be done. Soon it became apparent that the most effective method of progress was to try to understand natural phenomena, their whys as much as their hows. Now it can be said that it is possible to achieve almost anything we want—so great is the effectiveness of technology based on the experimental method. Thus, the main issue for scientists and for society as a whole is now to decide what to do among all the things that could be done and should be done. Unless scientists are willing to give hard thought—indeed, their hearts—to this latter aspect of their social responsibilities, they may find themselves someday in the position of the Sorcerer's Apprentice, unable to control the forces they have unleashed. And they may have to confess, like Captain Ahab in *Moby Dick*, that all their methods are sane, their goal mad. ***René Dubos. The Dream of Reason. Horizon 3:4 July 1961.***

reports of councils and bureaus

"Audio analgesia"

COUNCIL ON DENTAL THERAPEUTICS

Interest in a phenomenon described as "audio analgesia" was stimulated by the publication in late 1959 of an article by Gardner and Licklider who described the use of sound to allay pain produced by dental operations.[1] A subsequent article by Gardner and co-workers has since appeared.[2]

In the "audio analgesia" technic, sound from a modified tape recorder or phonograph is provided to the patient through earphones. The patient may receive sound of two types, music and masking sound, the ratio and the intensity of which he himself can control. The masking sound, sometimes called white sound, consists of a mixture of a wide range of sound frequencies which produce a roaring noise sometimes described as similar to that of a loud waterfall. The music ordinarily is varied to suit the choice of the patient. The patient is instructed to increase the intensity of the music or masking sound or both when he feels pain.

While the recent literature makes reference to the earlier use of music, but not masking sound, to allay pain and fear, these earlier studies apparently were either inadequately reported or pursued so superficially that they have gone almost unnoticed.[3,4] But the more recent studies of Gardner and his co-workers did not go unnoticed and the result has been twofold.

First, the reaction of many members of the dental profession has been enthusiastic as demonstrated by the sudden and frequent appearance of discussions of "audio analgesia" in the literature and by the formation of an organization devoted exclusively to "audio analgesia." It is important to note that most of these recently written communications are comprised mainly of personal opinions rather than scientific facts. Second, a surprisingly large number of manufacturing concerns and distributors have attempted to sell "audio analgesia" devices to practicing dentists. This enthusiasm of some dentists

and commercial concerns was of interest to the Council on Dental Therapeutics because the Council felt that the safety and efficacy of "audio analgesia" devices had not been given adequate attention. Of greatest urgency was the lack of information relating to hazard, particularly to the ear.

The possibility of hearing damage resulting from the injudicious use or poor design of "audio analgesia" devices has been discussed, or at least mentioned, in various recent editorials[5-7] and articles.[2, 8-10] The authors of other articles have seen fit to confine themselves to the historical aspects of the subject and to testimonial endorsement of "audio analgesia" as a phenomenon of unusual value in dental practice. The Council believes that the first step which the dental practitioner should take in placing "audio analgesia" in the proper perspective is to assure himself of the safety of the device which he proposes to use.

The second major consideration which the dentist should make in placing "audio analgesia" in proper perspective is that of efficacy. The Council has had difficulty in precisely evaluating the efficacy of these devices, partly because of the paucity of the type of data which would clearly establish efficacy and partly because of a difficulty in defining "efficacy" and "analgesia" as these terms apply to the problem at hand. The reports dealing with the clinical use of "audio analgesia" devices are impressive for their consistency in describing successful clinical application. However, some of these reports are disappointing for their listings of the prerequisites—many of them psychological—for successful "audio analgesia" and stress heavily such things as the necessity for the proper rapport between patient and dentist, the elimination of extraneous noises in the dental office and the necessity for adequate experience with the device by both the patient and dentist before optimum results can be expected.

Data from controlled clinical studies on the effectiveness of "audio analgesia" devices are completely lacking. With the exception of some interesting laboratory data, available data are confined to clinical observation. But the published clinical data are comprised of studies on large groups of patients and, as already mentioned, the opinions of the observers are consistently favorable. Results of clinical tests have been expressed most commonly in terms of the percentage of patients in whom "audio analgesia" produced complete insensitivity to pain as compared to those who experienced slight, but tolerable pain and those in whom "audio analgesia" was ineffective. In a series of 1,000 patients, Gardner reported that in 65 per cent of patients "audio analgesia" was completely effective, and in 25 per cent sufficiently effective so that no conventional anesthetic was needed.[2] Of 5,000 dental operations performed by eight collaborators of Gardner, "audio analgesia" was employed "successfully" in 90 per cent.[11] Of 4,500 dental operations performed by practitioners who purchased "audio analgesia" machines, a poll conducted by Gardner indicated that the per cent "success" was 77.[11] Schermer[4] reported that an audio analgesic device "produced effective distraction analgesia" in 76 per cent of 1,200 patients. Monsey[10] studied the effects of "audio analgesia" on 400 patients in which he graded the degree of effectiveness according to the type of dental procedure, emotional characteristics of the patient and the age of the patient. Interestingly, the per cent of "excellent" results was greater for patients undergoing minor procedures (95 per cent) than for patients undergoing average procedures (83 per cent) and major procedures (67 per cent). Monsey also reported somewhat less effectiveness in nervous patients than in those who weren't nervous and somewhat more effectiveness in older people than in younger people.

The results cited are interesting, but as yet unanswered is the very critical ques-

tion of what proportion of the reported effectiveness of "audio analgesia" is due to psychophysiological factors. Several investigators have stressed the importance of the factors of suggestion, relaxation and diversion induced by the sound and the importance to the patient in being able to himself control the intensity of the sound he receives. The influence of psychophysiological factors on the intensity of pain perceived, of course, has been recognized for a long time and data to support this concept are convincing.[12] Practically every clinical investigator of analgesic agents is aware of that segment of any test group called "placebo reactors"; that is, those individuals who obtain pain relief from a placebo. Beecher,[12] for example, has pointed out that about 30 to 40 per cent of patients suffering from postoperative pain are relieved by placebos. While the proportion of individuals purported to obtain relief by "audio analgesia" of the pain associated with dental operations is in the order of twice the number of placebo reactors reported by Beecher, this disparity could be due to such factors as the difference in the type and severity of pain in the two types of patients and in differences in the investigative technics. For example, compare the 30 to 40 per cent placebo effect in postoperative patients with the pain of headache which has been reported to be relieved by placebos in 52 per cent of patients.[13]

The laboratory data relating to "audio analgesia" are much more interpretable than the clinical data. Electrical recordings from central nervous system pathways of laboratory animals have revealed that the transmission of nerve impulses induced by a painful stimulus can be blocked or altered by a second sensory stimulus. Thus, the transmission of impulses in certain thalamic neurons can be blocked by auditory stimuli whose impulses travel by similar neuroanatomic routes.[14] Other studies in which recordings were made from spinal cord neurons indicate that pain impulses arising from neural structures in the skin can be altered by vibration applied to the surrounding skin area.[15] Perhaps the most direct approach to gaining information about "audio analgesia" in the laboratory has been that of testing the ability of sound to modify the pain response to electrical tooth stimulation in trained human subjects.[16] The latter studies seem to indicate that pain threshold is raised by "audio analgesia" devices and that the duration of the subjects' tolerance of the painful stimulus is lengthened. These human laboratory experiments are not, of course, comparable except in a general way to the clinical situation in which "audio analgesia" is used for pain induced by actual dental treatment. They differ in several respects from typical clinical conditions. There is very likely a difference in the degree of attentiveness to the painful stimuli, which in themselves are quite different, in the two situations. Furthermore, while the laboratory subject is trained, the same is probably not true of most dental patients. There is ample evidence that all three of these variables—attentiveness, type of stimulus and training—characterize some of the important differences between laboratory studies in pain and those in which pain is studied under actual clinical conditions. These and other such differences are discussed in detail in a recent book by Beecher.[12]

The Council has voted to exclude "audio analgesia" devices from its classification program until more definitive data are available. The Council wishes to encourage further investigation which may provide a better basis for assessing the efficacy of these devices. It is the understanding of the Council that a procedure is available whereby the devices will become eligible for advertising and exhibit in publications and meetings of the American Dental Association, provided (1) a device is certified by an acceptable testing laboratory to meet the physical standards established in the Council's report, (2) the devices are ac-

companied by directions for use which conform to the safety standards established in the Council's report, and (3) the promotional claims for the product are limited to those related to diversion or other psychological factors. More detailed information concerning this program may be obtained from the Department of Advertising and Exhibits of this Association.

The Council on Dental Therapeutics may review the status of these devices and possibly include them in the Council's classification program at any time that a substantial amount of new evidence becomes available to indicate an analgesic effect similar to that produced by drugs.

At the request of the Council on Dental Therapeutics, two recognized authorities in the effect of noise upon the ear have prepared safety standards for the design and use of "audio analgesia" devices. These standards follow as part of this report and constitute a basis upon which the safety of each device can be assessed.

MINIMUM REQUIREMENTS FOR APPARATUS FOR "AUDIO ANALGESIA"

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GENERAL COMMENTS

The maximum levels of acoustic output specified herein are believed to be (1) sufficiently high to produce a satisfactory effect in most patients with whom the method is successful at all, and at the same time (2) low enough to be completely safe for normal ears, provided the stated limitations on duration of noise exposure are observed and proper rest periods are allowed.

The limits for maximum output and the rules for permissible durations of exposure given in Tables 1 and 2 are based primarily on data collected at the Research Center of the Subcommittee on Noise of the Committee on Conservation of Hearing of the American Academy of Ophthalmology and Otolaryngology. This Research Center, located in Los Angeles, has studied the relations of noise exposure to permanent changes in hearing produced over long periods of time in noisy industrial situations, and also the time and intensity of brief noise exposures that produce temporary threshold shift.[17-19]

The effects of exposures for several minutes to very intense speech, noise and musical tones have been explored at Harvard[20] and at Central Institute for the Deaf.[21] Much greater intensities of sound were employed in those tests than are permitted in the present specifications, but in spite of this a measurable permanent change in hearing was produced in only one subject.

The risk of causing some permanent loss of sensitivity of hearing by habitual exposure to noise depends not only on the intensity of the noise in its various octave bands but also on the schedule of noise exposure in terms of minutes of exposure and of rest on a single day, the number of days per week or month on which noise exposure occurs, and the number of years of habitual noise exposure. In "audio analgesia" the noise exposure is not habitual. The occasional exposures are measured in minutes per day and they occur on only a few days in any one year. The maximum allowable acoustic levels listed are established on the assumption of such limited exposures.

Limits of allowable noise exposure on any one day are comparable to the permissible limits of dosage of a drug that is rather rapidly eliminated from the system at first but for which elimination is

Table 1 • Acoustic rating curves for apparatus for audio analgesia. Sound pressure levels by octave bands, in decibels relative to 0.0002 microbar, measured in a 6 cc coupler

Rating curve	75 to 150 cps	150 to 300 cps	300 to 600 cps	600 to 1,200 cps	1,200 to 2,400 cps	2,400 to 4,800 cps	Above 4,800 cps	Control setting
—	—	—	—	—	—	—	—	Off
102	107	107	107	102	97	91	85	Quarter Loudness
107	112	112	112	107	102	96	90	Moderate
112	117	117	117	112	107	101	95	Half Loudness
117	122	122	122	117	112	106	100	Three Quarters
122	127	127	127	122	117	111	105	Maximum

The Rating Curve (RC) designations correspond to the sound pressure level in decibels permitted in the 600-1,200 cps octave band. For a curve of this shape this octave band is the most important for defining the possible hazard of noise exposure. Its level is therefore employed to designate the entire rating curve.

The terms in the Control Setting column may serve as approximate relative designations for the respective rating curves.

The rating curves as given do not correspond exactly in shape or level to any published damage risk criteria. They have been drawn to compromise the objectives of protection of hearing, probable effectiveness in producing analgesia, and acceptability to patients. See also Section 1.2 NOTE 1 concerning the difference between the pressures measured in a 6-cc coupler and the pressures developed at the ear.

Table 2 • Time limitations for each rating curve

Rating curve	Allowable continuous exposure	Interrupted exposure			
		Allowable cumulative total exposure		Schedule of necessary rest periods	
		During 1 hour over-all	During 2 hours over-all	If each exposure is	Then each minimum rest period must be
102	120 min.	60 min.	120 min.	Continuous exposure permitted	
107	40 min.	50 min.	90 min.	2 min. On	½ min. Low or Off
112	20 min.	25 min.	45 min.	2 min. On	1 min. Low or Off
117	10 min.	15 min.	25 min.	1 min. On	1 min. Low or Off
122	5 min.	10 min.	15 min.	1 min. On	2 min. Low or Off

The cumulative total numbers of minutes permitted for interrupted exposure, given in the third and fourth columns, are based on individual exposures not longer than indicated in the fifth column and separated by at least the rest period indicated. If the rest periods are shorter, the cumulative total must be reduced. If the exposure periods are less than the duration shown, the rest periods may be reduced proportionately but the cumulative total may not be increased.

Two minute exposures may be used at the 117 and the 122 db rating levels, but the rest periods must be increased or else the total cumulative exposure reduced. The upper limits are the durations given in column 1, which are for single continuous exposures. The durations of exposure stated in the table are not additive. For example a patient may be given a continuous exposure of 10 min. at the 117 db setting, or 5 min. at 122 db, or half of each, but not all of both.

The time limits of Table 2 for safe noise exposures are believed to be very conservative. The numbers should not be taken out of context, however, nor should they be interpreted to mean that any longer exposures at the intensities or similar exposures to somewhat higher intensities are necessarily injurious. There is a margin of safety of many decibels and many minutes. This wide margin of safety is desirable at the present time, however, until more information is available concerning the variations in the general population of the susceptibility of ears to noise.

not quite complete for a day or two. The total intake of such a drug in an hour and a whole day and the intervals between doses are important as well as the maximum dose that is permissible at any one time.

I. MINIMUM REQUIREMENTS OF APPARATUS

1. *Separate Controls for Music and Noise*

Separate controls, arranged to be operated by the patient, shall be provided for the music channel and the noise channel. Gradation may be by five or more discrete steps or may be continuous over a range of attenuation of at least 20 decibels from the maximum or "full on" position. An "off" position shall also be provided (See Table 1).

If the gradation of output is continuous it is recommended, but not required, that light detents be provided corresponding at least to the levels 5 db and 10 db below the maximum output in each channel.

Note: A sound pressure level 10 db down from maximum will give a sensation of about half the maximum loudness.

2. *Earphones and Cushions*

The acoustic output shall be delivered to the patient from two earphones. Earphones with cushions of the "doughnut" type that make an acoustic seal around the ear, not against the ear, are recommended, especially because their acoustic outputs can be measured by standard procedures. If other earphone types are employed, the tables shown in these "Minimum Requirements" will not apply directly. Corrections for these tables must be obtained by loudness-balance procedures between the other type earphone and a standard earphone mounted in a "doughnut" cushion. (See also the note 1 of Section I.3 *Noise*.)

3. *Noise*

The noise shall have a continuous acoustic spectrum extending at least from 150 cps to 2,400 cps. The maximum acoustic output in each earphone by octave bands, measured in an ASA 6-cc coupler or an NBS-9A coupler and using meters and filters that conform to the relevant American Standards Association specification,[22] shall not exceed the following sound pressure levels in the respective octave bands.

Octave band	Maximum permissible sound pressure level in decibels relative to 0.0002 microbar in 6-cc coupler	Tolerances
75 to 150 cps	127	+3
150 to 300 cps	127	+3
300 to 600 cps	127	+3 −6
600 to 1,200 cps	122	+2 −4
1,200 to 2,400 cps	117	+3 −6
2,400 to 4,800 cps	111	+3
4,800 and upward	105	+4

Note 1: A 6-cc coupler is specified for the measurement of the acoustic output of the earphones although the volume enclosed by the type of cushion specified in Section I.2 is about 20 to 25 cc. This choice is made because of the greater availability of 6-cc couplers. Allowance has been made in specifying the permissible sound pressure levels, and also, in Table 2, in specifying permissible durations of exposure, for the lower acoustic pressure developed by a given earphone in the larger air space under the cushion. The factor involved is approximately 10 db.

Note 2: Acoustic pressures cited are in terms of root-mean-square (rms) values throughout.

4. *Music*

The maximum acoustic output of each earphone when the music channel is set to its maximum output shall be 10 db lower, on the average, in each octave band than is specified in Section 3 for noise. Electrical peak limiting is recommended to prevent high instantaneous acoustic pressures from sharp percussion effects in the music.

Note: With these restrictions on the maximum output of the music channel the music may be disregarded in the estimation of noise-exposure. The music will rarely, if ever, be maintained for as much as an hour at maximum setting of the control, and even this should be tolerable. The duration of exposure to the noise, not the music, will be the dominant factor from the point of view of possible hazard.

5. *Accuracy of Acoustic Output*

For the guidance of the user, the nominal maximum sound pressure level of the acoustic noise output of each earphone in the 600-1,200 cps band shall be prominently marked on the control box or panel. The maximum sound pressure level of the noise measured in this octave band shall not deviate from this marked nominal band level by more than + 2 or − 4 db. In the other octave bands the measured outputs may not exceed the values on the corresponding rating curve (see Table 1) by more than 3 db except for the band above 4,800 cps where the value on the rating curve may be exceeded by 4 db. The output levels may fall below the values of the corresponding rating curve by 6 db in the 300-600 and the 1,200-2,400 cps bands. No particular minimum output is required for the other octave bands.

The nominal maximum output need not correspond to any of the particular rating curves in Table 1. Intermediate curves, such as 115 or 119, may be interpolated between the curves given in Table 1 by adding or subtracting a constant number of decibels from the values for one of the given curves.

6. *Characteristics of the Music*

The recordings of music shall be so selected that the music is substantially continuous and has a restricted dynamic range so that there are no great differences in loudness between the louder and the softer passages.

7. *Monitor Earphone*

A monitor earphone, to be worn by the operator, shall be provided. A headband with a single earphone is recommended so that the operator may have one ear unobstructed. An adjustable attenuator shall be provided in this output channel so that the operator may monitor at a level of his own choice the sound levels selected by the patient from moment to moment.

8. *Monitor Meter*

A monitor timing-meter is strongly recommended but is not required at present. This meter should monitor the electrical input, of noise and music combined, to the earphones. It should indicate at least the two following total cumulative times: (a) the number of minutes that the patient has been exposed to a sound level in the 600-1,200 cps octave band of 117 db or more, and (b) the number of minutes of exposure in this band to 122 db or more.

Note: The purpose of the timing meter is to give immediate visual indication of the cumulative durations of noise exposures in the terms in which the limits are stated in Table 2. Two additional useful indications would be the number of minutes of low-level sound or no sound that have elapsed since the most recent exposure at each of the two monitoring levels.

9. *Extended Range Model*

An instrument intended for further investigation of "audio analgesia" may be provided with an extended range of available sound levels. The highest sound levels recommended for such a research instrument are 10 decibels above those of

Rating Curve 122 (Table 1). If an extended intensity range is provided a monitor meter, designed to sum the exposure time to levels of 127 db, and also 132 db if provided, as well as to the levels of 117 db and 122 db, is required. These levels refer to the octave band 600-1,200 cps, as in Section I.8. Furthermore, the intensities above Rating Curve 122 must not be available to control by the patient until a separate switch is closed or a safety stop is released by the operator. A clear label must indicate that the extended range is not for routine use.

Note: See also Section II.3.A concerning otological consultation and audiometric monitoring if the extended intensity range is to be used.

II. INSTRUCTIONS TO USERS

1. *Maximum Noise Exposures*

A. The manufacturer must inform the prospective users of "audio analgesia" equipment of the maximum noise exposures, including any necessary rest periods, for which his equipment is designed. This information must include an adequate presentation of the acoustic and physiological principles involved and must be clearly and prominently stated in the instructions for the use of the equipment. The maximum single exposures must also be indicated on the monitor meter if one is provided.

B. In a rest period the noise must be turned low or off and the music must not exceed Rating Curve 107.

C. The maximum durations of noise exposure and minimum required rest periods which may be stated in the instructions to the user as safe and reasonable for routine use on normal ears are given in Table 2 for the Rating Curves which are given in Table 1. The manufacturer must also translate the substance of Section 1, "Maximum Noise Exposures" and of these tables into specific directions for his apparatus in a way that will assure safe operation at or below the stated maximum noise exposures.

D. If the maximum acoustic output for noise is not higher than Rating Curve 102 in any octave band (see Table 1) the exposure may be continuous for two hours.

Note 1: If any comparison is made between the limits of noise exposure permitted in these specifications and the "damage risk criteria" that have been proposed for military and industrial noise exposure, allowances must be made for (1) the brief durations of noise exposure involved in "audio analgesia," (2) the small number of days on which exposure occurs, (3) the relative ineffectiveness on the human ear of a given sound pressure generated by an earphone as compared with the same sound pressure measured in a free acoustic field, and (4) the difference in capacity between a 6-cc acoustic coupler and an earphone equipped with the cushions specified in Section I.2. All of the published damage risk criteria refer to free field measurements but the present specifications refer to earphone pressures measured in the acoustic coupler. The thresholds of audibility, discomfort, pain and damage risk are systematically about 6 db higher for the latter condition of listening and sound measurement.

Note 2: See note in Section I.4 concerning exposure to music.

2. *Instructions to Patients*

A. Patients should be instructed to turn up the music or the noise or both as high as they desire to produce the analgesic effect during drilling or other potentially painful procedures, but to turn down the noise and music to half loudness or less as soon as the higher sound levels are no longer necessary.

Note: Most patients will adjust the sound levels in this way of their own choice. Actually a frequent cause of ineffectiveness of "audio analgesia" seems to be a disinclination of some patients to listen to sounds that are loud enough. On a second trial on another day, however, they may be willing to accept higher sound levels than on the first day.

3. *Otological Consultation*

Prospective users must be informed that:

A. For some patients noise levels above those given in Section I.3 are required to obtain satisfactory analgesia, and in some

situations exposures longer than those given in Table 2 may be necessary. The present specifications are intended to insure safety in routine use, and the limits set are therefore conservative. They are not intended to preclude cautious explorations of higher levels and longer exposures on an experimental basis, but such explorations should be undertaken only under the supervision of an otologist and only when monitored by careful, otologically supervised, pure-tone audiometry.

Audiograms should be made before and after the use of more extended or more intense noise, to assure that the patient's temporary threshold shift is not excessive (50 db or more) and that recovery is complete before another exposure is undertaken. Temporary threshold shift at 4,000 cps is the most sensitive indicator of the severity of a noise exposure, and also of complete recovery.

4. *Otological Contraindications*

Prospective users must be informed that:

A. The rules of Table 2 apply to only the use of "audio analgesia" with individuals with normal ears and hearing. "Audio analgesia" should not be undertaken on a patient with otosclerosis who has had the operation of either stapedectomy or stapes mobilization. With patients who have had the fenestration operation "audio analgesia" must be undertaken cautiously because of possible vertigo. On the other hand, any form of conductive hearing loss will reduce the effectiveness as well as the hazard of any particular noise.

B. A history of episodes of vertigo, particularly if they were accompanied by tinnitus and impairment of hearing or both, is a contraindication to the use of "audio analgesia."

C. If a patient complains of tinnitus (ringing in the ears) for more than 20 minutes following a noise exposure or else of vertigo during exposure, such exposure should be discontinued and "audio analgesia" should not be resumed except under otological supervision, if at all.

*Director of research, Central Institute for the Deaf, St. Louis.

†Director of research, Research Center of the Subcommittee on Noise of the Committee on Conservation of Hearing of the American Academy of Ophthalmology and Otolaryngology, Los Angeles.

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Association policies on civil defense

COUNCIL ON FEDERAL DENTAL SERVICES

In its report to the 1960 House of Delegates, the Council dealt at considerable length with various facets of the profession's responsibilities in the field of civil defense. Four resolutions were submitted in the report, each dealing with a specific problem or area of needed policy development. The resolutions were unanimously approved by the House of Delegates and became official policies of the Association.

Shortly after the annual session, these policies were transmitted to the constituent society civil defense committee chairmen, together with the full text of the background data provided in the report of the Council.

The current critical state of international affairs has prompted the editor of THE JOURNAL to discuss elsewhere in this issue the federal administration's increased attention to nonmilitary preparedness as an element of our nation's over-all security plans. Since that editorial mentions the actions of the 1960 House of Delegates, the Council believes that this would be a particularly appropriate time to transmit directly to the membership the text of the 1960 civil defense policies. The first resolution adopted by the House of Delegates approved the following "Statement on Disaster Medical Responsibilities":

> The American Dental Association recognizes that a mass attack on the United States would result in a severe disparity between the number of casualties among the surviving population and the number of physicians available to treat them. It is further recognized that, in order that physicians' skills may be conserved under disaster conditions, members of other health disciplines, including dentistry, must acquire proficiency in the performance of emergency medical functions. To this end, the following principles are approved:
>
> a. Every dentist is responsible for taking an active part in civil and defense mobilization planning and training in his community.
>
> b. Dentists should train to develop the ability to perform such disaster medical services as will enable them effectively to assist the medical profession in preserving the life of and restoring the health of the injured population.
>
> c. Additional functions in the emergency performance of which dentists must become proficient shall include those listed in the *Report on National Emergency Medical Care.*
>
> d. Constituent and component dental societies have an obligation to develop either independently or in cooperation with state and local medical and hospital associations such programs as will enable their members to acquire the necessary proficiency in emergency medical care principles and technics.

The *Report on National Emergency Medical Care* mentioned in paragraph (c) of the Statement listed the following functions in the emergency performance of which dentists must become proficient:

> a. First-aid, including but not limited to artificial respiration, emergency treatment of

open chest wounds, relief of pain, treatment of shock and the preparation of casualties for movement.

b. Control of hemorrhage.

c. Attainment and maintenance of patent airway, and intratracheal catheterization, to include tracheotomy.

d. Proper and adequate cleansing and treatment of wounds.

e. Bandaging and splinting.

f. Triage of facial and oral injury cases.

g. Oral surgery.

h. Administration of anesthetics under medical supervision.

i. Assisting in surgical procedures other than oral.

j. Insertion of nasogastric tubes to include lavage and gavage, as directed.

k. Administration of whole blood and intravenous solutions, as directed.

l. Administration of parenteral medications, as directed.

m. Catheterization of males and females.

n. Administration of immunizing agents, as directed.

The second resolution endorsed the provisions of the Model State Civil Defense Act dealing with immunity from civil actions for damages and exemption from prosecution under state medical practice acts for authorized civil defense workers, and urged each constituent society to seek, either independently or in cooperation with other health organizations, the enactment of state legislation which would afford such immunity and exemption to its members and to other groups which have a recognized responsibility to participate in the management and treatment of casualties in emergency conditions.

The third resolution authorized the appropriate agencies of the Association to support before Congress those portions of the annual budget appropriation requests of the Office of Civil and Defense Mobilization which pertain to the program of the Division of Health Mobilization of the U. S. Public Health Service. In accordance with this authority, the Council filed an appropriate statement with the Subcommittee on Independent Offices of the House Committee on Appropriations in connection with the Fiscal 1962 appropriations for OCDM. Messages of appreciation subsequently were received from the Director of OCDM, Mr. Frank B. Ellis, from OCDM's Assistant Director for Health, Dr. W. Palmer Dearing, and from the Chief of the Division of Health Mobilization, Dr. Carruth J. Wagner.

The final resolution adopted by the House of Delegates endorsed the Family Shelter Program promulgated by the federal government and urged that every member of the Association contribute to the security of the nation by taking such measures as reasonably will insure the ability of himself and his family to survive a nuclear attack.

The recent critical analysis and report by President Kennedy on the state of nonmilitary preparedness, and his recommendations for markedly increased activity in this vital area, provide significant impetus to the foregoing policies. The Council hopes that each member will regard them as valuable guidelines toward the fulfillment of personal responsibility.

Special aids for National Children's Dental Health Week

BUREAU OF DENTAL HEALTH EDUCATION

A number of special aids, which local dental society committees can use in their programs, are available for the 1962 National Children's Dental Health Week.

Among these aids are window displays, outdoor advertising posters, car cards and miniature posters, all in full color and all with the illustration used on the 1962 dental health week poster.

SPECIAL AIDS

Window Displays • The window displays are being made available this year for the first time in response to many requests. They are single sheets, 36 by 50 inches, which can be glued or taped to windows or tacked to backboards. Prices are: (1 to 9 displays) 50 cents each; (10 to 24) 45 cents each; (25 to 99) 40 cents each; (100 or more) 35 cents each.

Outdoor Advertising Posters • Size of these 24-sheet posters will be 234 by 104 inches. Price is $6.50 each. These posters must be ordered by November 15. Only the number of posters ordered by that date will be printed. Orders received after November 15 will not be filled.

Car Cards • Size of these cards, for use in streetcars and buses, will be 24½ by 11 inches. Prices are: (1 to 24) 20 cents each; (25 to 99) 18 cents each; (100 or more) 16 cents each. Car cards must be ordered by November 15. Only the number of cards ordered by that date will be printed. Orders received after November 15 will not be filled.

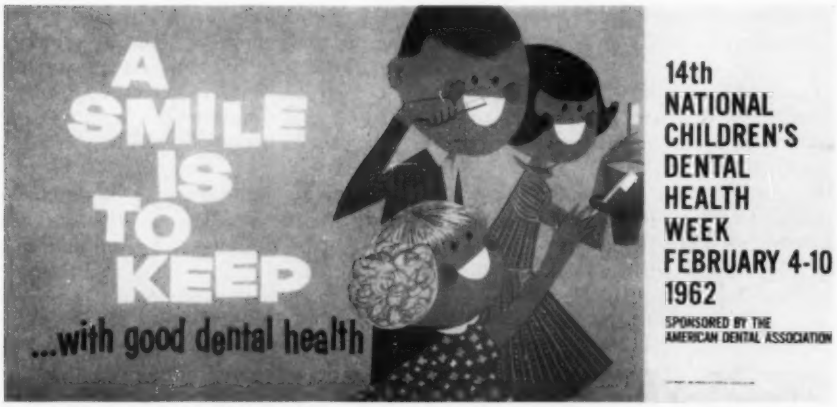
Miniature National Children's Dental Health Week Posters • It is suggested that dentists enclose these 3 by 3½ inch posters with their February statements. Some telephone companies and some banks have been willing to include the miniature posters with their bills and statements. The miniatures also are excellent handouts for children. Prices are: (100 to 499 posters) $0.85 per 100; (500 to 999) $0.75 per 100; (1,000 to 4,999) $6.00 per 1,000; (5,000 and over) $5.50 per 1,000.

OTHER MATERIALS AVAILABLE

Other materials also are available for use during the dental health week.

Television Interview • A 10-minute interview concerning dental health, on film, may be obtained on a free-loan basis. This interesting, unique film is intended for showing on television.

So that the film can be used throughout the year, no mention of the dental


A SMILE IS TO KEEP
...with good dental health
14th NATIONAL CHILDREN'S DENTAL HEALTH WEEK FEBRUARY 4-10 1962
SPONSORED BY THE AMERICAN DENTAL ASSOCIATION

The same illustration, in full color, will appear on the dental health week poster for 1962, the window displays, outdoor advertising posters, car cards and miniature posters

health week will be made. However, with the film there will be suggestions for the local society to use during the opening and closing sections if a 15-minute time segment is given by the television station.

Interviewer is Jim Stewart, who won a Chicago Emmy award for his show "Here's Geraldine." The black and white film was produced by Television Features Inc., which also produces Encyclopaedia Britannica's "Helpful Homer."

The film will be available for preview after October 1 but may not be shown on television before February 4, the first day of National Children's Dental Health Week.

Films for School Children • Two new films, "What Do We Know About Teeth?" for first to third graders, and "Project: Teeth—Dental Health and Classroom Science," for fourth to sixth graders, have been produced by the American Dental Association. Both were filmed in classrooms in suburban schools near Chicago. In addition to giving information about dental health, the films suggest ways of teaching about dental health and, by leaving some questions unanswered, encourage further explorations of the subject by youngsters viewing the films.

Length of the sound, color films is 14½ minutes. Each may be purchased for $75 or rented for $3 from the Bureau of Audiovisual Service. The films are available now.

Both films have been cleared for television and are especially suitable for showing on educational television stations.

Radio Transcriptions • Eight five-minute radio programs and five 1-minute radio spot announcements are available on two 33⅓ rpm records.

Each of the programs may be played on only one radio station and only once in any one community. However, they may be used without restriction for schools, service clubs, P.T.A.'s and similar groups.

The records may be purchased for $4.50 each or rented for a two-week period for $2 from the Bureau of Audiovisual Service.

Subjects of the programs are: fluoridation, the importance of "baby" teeth, tooth care during pregnancy, getting ready for a job, preparing for retirement, preparing your child for school, take time

to take care of your teeth and motivating youngsters to take care of their teeth.

Table-Top Display • This cardboard display is designed to be used to call attention to the importance of attractive looking teeth. The exhibit may be placed in reception rooms, store windows or school lobbies or displayed at health fairs or similar events.

The display shows a man looking in a mirror. Before the flashing light goes on, the mouth is seen in a closed position. When the light flashes on, the mouth opens. "Look at your teeth . . . everyone else does!" says the lettering at the top of the display. It is suggested that a mirror be placed beside the exhibit, to encourage passers-by to look at their teeth.

The displays are 26 inches wide and 24½ inches high. They may be purchased from the Order Department, American Dental Association, for $8 each. They are not available for rental.

Toothbrushing Kits • Each kit contains sufficient material for a classroom of 35 pupils. It includes a leaflet ("You Can Teach Toothbrushing") for the teacher, 35 children's toothbrushes, 35 small posters for the youngsters to paste on their bathroom mirrors at home, and 35 leaflets ("Help Your Child to Good Dental Health") for the children's parents.

If the children learn in school how to brush their teeth and then receive encouragement from their parents at home, they are much more likely to form good dental health habits. This is why the kit provides material for teacher, children and parents.

Toothbrushing kits may be purchased from the Order Department, American Dental Association, for $3 each, no more than many dental societies and women's auxiliaries are now paying for brushes to give to school children.

The kits were made possible by the cooperation of the Toothbrush Manufacturer's Association. If the pilot project is successful, the kits will continue to be made available.

Further information about these special aids may be obtained from the Bureau of Dental Health Education.

Also available from the Bureau, without charge, are program planning packets and 22 by 10 inch full-color posters. The packets are intended only for those dentists who are responsible for planning dental health week programs in their communities. The packets include program planning suggestions, speeches, two 4:40 minute radio scripts, 15-second and 30-second radio spot announcements and other material. Those requesting posters should indicate the number they will need.

Survey of public attitudes regarding dentures

VII. Summary

BUREAU OF ECONOMIC RESEARCH AND STATISTICS

There is widespread opinion that the volume of denture service provided by dental laboratory technicians directly to the public, contrary to the dental practice laws, has increased substantially in recent years. The Board of Trustees of the Association authorized a survey to illuminate this problem by obtaining information on the public's attitudes, knowledge and practices with respect to the acquisition of dentures.

The survey was conducted by mail, and survey panels maintained by National Family Opinion, Inc., Toledo, Ohio, were utilized. These panels are closely representative of the general population of the United States. Returns were received from 6,861 adults or more than 80 per cent of the families receiving questionnaires. Husbands and wives were asked to fill out their questionnaires independently.

KNOWLEDGE OF TECHNICIAN'S ROLE

Survey participants were asked how many months or years of training beyond high school they thought dental technicians had. A similar question was asked regarding dentists. Most people underestimated the training of dentists and overestimated that of technicians. The average number of years of training estimated for dentists was 4.5, compared to 2.6 for technicians. Respondents with no formal schooling estimated that dental technicians had 3.8 years of formal training, whereas actually most technicians have had less than a year of formal instruction in the craft. This misconception may be the reason why some people obtain their dentures from technicians.

One out of five respondents answered affirmatively the question "Do you know anything about the kind of work that is performed by a dental laboratory technician?" The percentage checking "yes" ranged from 12.3 per cent in the Southwest to 25.6 per cent in the Far West, and from 3.6 per cent of respondents with family income of less than $1,000 to 31.6 per cent with family income of $10,000 and more. Those who checked "yes" were asked to describe the work of the technician. Nearly all wrote that the technician made or repaired dentures or bridges, but relatively few added that this work was done for dentists. Probably most respondents knew this fact but assumed that it would be taken for granted.

Only 11.6 per cent replied affirmatively to the question "Are you acquainted with the working relationship between the dentist and the dental laboratory technician?" Of those who described this working relationship, the majority did so correctly.

To the question "Are any persons other than dentists allowed by law in your state to provide false teeth directly to the public?" about 70 per cent answered that they didn't know, 25 per cent checked "no" and 4.3 per cent checked "yes."

"Has a dentist ever sent you to a dental laboratory?" The percentage answering this question affirmatively was 4.1 per cent nationally, with a regional range from 2.3 per cent in the Southeast to 7.2 per cent in the Far West. Next to the Far West, the highest figure was in New England (4.5 per cent).

SOURCE OF DENTURES AND DENTURE REPAIRS

The percentage of respondents wearing dentures and bridges increased with age from 22.4 per cent for people 20 to 29 years of age to 78.3 per cent for people 60 and older, the figure for all respondents being 49.1 per cent. At each age level, more of the women than of the men reported wearing dentures or bridges. Regionally, the percentage of respondents wearing dentures or bridges ranged from 40.5 per cent in the Southwest to 52.5 per cent in New England.

Nearly one third of all respondents wore a complete upper and nearly one fourth a complete lower denture. Among people 60 and older, 62.5 per cent wore a complete upper and 50.0 per cent a complete lower denture.

Respondents wearing complete or partial dentures were asked whether their dentures had been obtained from a dentist or from a dental laboratory technician. "Dentists" was the answer checked by 93.7 per cent, "dental laboratory technicians" by 2.1 per cent and the remaining 4.2 per cent did not reply to this question.

The percentage of respondents admitting they had received their dentures directly from technicians ranged from 2.8 per cent in the Middle East and 2.7 per cent in the Far West to a low of 1.3 per cent in the Northwest. By population density, the range was from 3.7 per cent in the central cities in metropolitan areas of 2,000,000 or more, to 1.4 per cent in rural areas. A considerably larger percentage of men (2.8 per cent) than of women (1.6 per cent) indicated they had received dentures from technicians.

Denture wearers were asked why they chose a dentist or a dental laboratory technician. One third of the respondents who had patronized a technician gave "price" as the reason. A similar percentage of this group indicated the technician had a good reputation or was known to be skilled in making dentures.

Based on figures received from people who had acquired complete dentures during the preceding 12 months, the average cost of complete uppers obtained from dentists was $104.21, compared to $82.50 for those obtained from technicians. Comparable averages for complete lower dentures were $100.00 and $71.88.

In reply to a question directed to respondents wearing one or two complete dentures, only one respondent answered that extractions were performed by a dental technician.

Of the 65 respondents who had obtained dentures from technicians, 47 replied that they had found out about the technician from a "friend," and the remainder were scattered among miscellaneous sources of information such as newspapers, physicians and dentists.

A little more than one fourth of the people wearing complete dentures indicated dentures currently worn were replacements. Of this group, slightly over 1 per cent indicated, in reply to a question, that their first complete dentures had been obtained from a dental technician. A similar number declined to answer the question, and about 98 per cent checked "dentist."

All respondents were asked where they would obtain their dentures in the future —in the event it were necessary. Two per cent indicated the dentures would be

obtained from technicians, 1.2 per cent wrote in "undecided," 4.0 per cent did not answer and 92.8 per cent checked "dentist." These percentages are about the same as the percentages for source of dentures currently worn.

Eighteen per cent of all denture or bridge wearers indicated they had received repairs from dentists or dental laboratory technicians. Of this group, 6.3 per cent reported they had received the repairs directly from a technician and 93.7 per cent from dentists. The percentage of people going to a technician for repairs was more than twice as high for ages 40 and older as for ages under 40. The percentage going to a technician for repairs was particularly high in metropolitan areas, and higher in the central cities than in the suburbs.

There was no discernible trend in the statistics on source of either dentures or denture repairs according to family income.

AN OPINION SCALE

The questionnaire listed nine statements about dentistry, and respondents were asked to indicate whether they agreed or disagreed with each statement. The statement "In general, fees of dentists are reasonable" was agreed with by a majority of respondents; yet, the majority also agreed with the two statements to the effect that dentists charged too much for fillings and dentures. More of the young people than of the older people agreed that dentists' fees, in general, were reasonable. Three fourths of the survey participants agreed that "A person should always go to a dentist to get false teeth that are satisfactory," but 13.5 per cent agreed with the contradictory statement, "A person can get false teeth that are satisfactory directly from a dental laboratory technician."

When asked whether they agreed that it was necessary to go to a dentist (1) for repair of broken "plates" and (2) to have "plates" relined, between three and four times as many respondents agreed as disagreed.

"For people with two full plates, regular visits to the dentist are not necessary." A little more than one third agreed with this statement, a similar number declined to opine and about one fourth disagreed. Highest agreement was with the statement "Most dentists have a high degree of skill and knowledge," with which 85.9 per cent agreed.

FREQUENCY OF VISITS TO THE DENTIST

Information was elicited on length of time since last visit to a dentist and intended future frequency of dental visits. It was obvious from comparisons with other sources of data that respondents in this survey underestimated the length of time since they last visited a dentist. As shown in many other surveys, on the average, women had seen their dentist more recently than had men. There was a high correlation between length of time since last visit to a dentist and (1) educational level and (2) family income.

Less than one fourth of the respondents intended to go to the dentist as often as every six months in the future, and only two out of five as often as every year. "As need arises" was the most frequently checked answer. "Never" was the reply of 3.7 per cent. "Every six months" was checked by only 18.1 per cent of the men, compared to 26.3 per cent of the women. This reply was given by about 28 per cent of all respondents under 40; the percentage declined with each higher age group to 11.2 per cent of those 60 and older. The variation in replies to this question according to educational level and family income was striking.

CONCLUSIONS

Of people wearing complete or partial dentures, 2.1 per cent admitted obtaining

their dentures directly from a dental laboratory technician, and 4.2 per cent did not answer the question on source of dentures. The median percentage of "no answers" to nonopinion questions in this survey was approximately 2 per cent. It seems likely that nearly half of those who did not answer the question on source of dentures actually obtained their dentures from technicians but preferred not to divulge this information. Thus, it is estimated that a total of 4 per cent of the denture wearers obtained their dentures from technicians.

Based on responses in this survey, it was estimated that the population 20 and older received 5.5 million complete dentures during the year ending in April 1960. Limitations of data were such that a second upper or second lower denture received during the course of the year was not counted. In other words, no more than one complete upper or one complete lower denture was counted for any one individual. Had the survey included people under 20 and more than one denture of a given type received during the year, the estimate would have been slightly higher than 5.5 million.

In another survey conducted by the Bureau of Economic Research and Statistics, The 1959 Survey of Dental Practice, data were obtained from dentists on the number of complete dentures inserted. Based on the 1959 survey, it was estimated that dentists supplied 5.6 million dentures to the civilian population during 1959.

Although the coverage in these two surveys was not identical, it was very similar. The two estimates of complete dentures received or provided (5.5 million and 5.6 million) are almost identical and provide evidence that the number of complete dentures obtained directly from dental laboratory technicians is relatively small.

In The 1959 Survey of Dental Practice it was determined, from data on 25,901 patient visits, that complete upper dentures were provided at 1.4 per cent of the visits and complete lower dentures at .9 per cent of the visits. In a similar survey of dentists conducted by the Bureau nine years earlier, the 1950 Survey of the Dental Profession, data were obtained on services rendered at 34,010 sittings. In the 1950 survey, the percentages were exactly the same as in the 1959 survey—1.4 per cent for complete upper dentures and .9 per cent for complete lower dentures. These statistics provide strong evidence that the proportion of complete dentures that had been received by the public directly from technicians did not increase during the period from 1950 to 1959.

Although these statistics do not indicate an increase in the illegal provision of dentures during the past decade, the problem remains of sufficient dimension to warrant close attention. If technicians provided directly to the public 4 per cent of the 5.6 million complete dentures in 1959, the number provided was approximately 225,000.

There is some indication in the survey results that the problem may increase in the future. It is true that the percentage of people indicating future dentures would be obtained from technicians was practically the same as the percentage of denture wearers who had patronized technicians in the past. It should be noted, however, that 13.5 per cent of the respondents agreed with the statement that satisfactory dentures could be obtained directly from a dental laboratory technician, and only 22.5 per cent disagreed with this statement.

Council adopts American Dental Association Specification No. 17 for Denture Base Temporary Relining Resin

COUNCIL ON DENTAL RESEARCH

The following specification was recently adopted by the Council on Dental Research as the official specification of the American Dental Association for denture base temporary relining resin.

The specification was formulated through the Specifications Committee of the Dental Materials Group (International Association for Dental Research) and by one of its subcommittees.

The Council wishes to acknowledge, with thanks, the work of the subcommittee members, who are: H. D. Ayers, Jr., (chairman), School of Dental and Oral Surgery, Columbia University, New York; Max A. Pleasure, Long Island City, N.Y.; J. S. Jordan, H. D. Justi & Son, Philadelphia; Mrs. Judith Pinter, Cosmos Dental Products, Inc., Long Island City, N.Y.; Elliott M. Feinberg, Acralite Co., Inc., Brooklyn, N.Y.; G. M. Brauer (secretary), dental research section, National Bureau of Standards, Washington, D.C.

AMERICAN DENTAL ASSOCIATION SPECIFICATION NO. 17 FOR DENTURE BASE TEMPORARY RELINING RESIN

(Approved August, 1961. Effective August 1, 1962)

1. SCOPE AND CLASSIFICATION

1.1 Scope. This specification is for hard setting self-curing resin used as a temporary relining material for artificial dentures. The soft flexible relining resins are not covered by this specification. The American Dental Association recognizes the wide use of direct denture reliners and the hazards associated with their use. For other than temporary use it is recommended that the denture be relined or rebased by employing a cast and flasking technic.

1.2 Type. Denture base relining resin covered by this specification shall be of the self-curing type, powder and liquid class and shall be of two colors, pink and clear.

2. APPLICABLE SPECIFICATIONS

2.1 Specification. Portions of American Dental Association Specification No.

12 for Denture Base Resin, as it applies to Type II self-curing resin, forms a part of this specification as indicated in the various sections. (Copies of American Dental Association specifications may be obtained free upon application to the Council on Dental Research, American Dental Association, 222 E. Superior St., Chicago 11, or to the American Dental Association Research Division, National Bureau of Standards, Washington 25, D. C.)

3. REQUIREMENTS

3.1 Liquid. The liquid shall be water clear and free of deposits or sediment.

3.2 Powder. The powder shall be free of extraneous material such as dirt or lint and free of lumps.

3.3 Uncured resin.

3.3.1 Consistency. The average diameter of the disks resulting from the consistency tests as described in 4.3.1 shall be not less than 3.5 cm. (1.38 in.) nor more than 5.8 cm. (2.28 in.).

3.3.2 Temperature rise. The average peak temperature measured as described in 4.3.2 shall be not more than 75°C. (167°F.).

3.3.3 Hardening time. The time of hardening, as evidenced by the time of occurrence of the peak temperature, shall be not less than 6 minutes nor more than 15 minutes when measured as described in 4.3.2.

3.4 Cured resin.

3.4.1 Polish. The resin shall present a smooth surface having a high gloss when polished by conventional dental methods.

3.4.2 Translucency. The specimen disk as described in 4.3.4 shall be translucent.

3.4.3 Porosity. The specimen disk formed as described in 4.3.4 shall show no bubbles, or voids that are large in quantity or size.

3.4.4 Hardness. The Knoop number as determined according to the procedure outlined in 4.3.3 shall be not less than 10.0.

3.4.5 Sorption. The increase in weight of the resin shall be not more than 0.7 mg. per square centimeter of surface after immersion in water for 24 hours at 37 ± 1°C. (98.6 ± 1.8°F.) when tested according to 4.3.4.

3.4.6 Solubility. The loss in weight of the resin shall be less than 0.07 mg. per square centimeter of surface when tested as described in 4.3.5.

3.4.7 Color stability. The resin shall show not more than a slight change in color when subjected to the color stability test of section 4.3.6 of the American Dental Association Specification No. 12 for Denture Base Resin.

3.4.8 Manufacturer's instructions. Instructions for storing and processing shall accompany each package. Instructions shall include the powder-liquid ratio (by volume), the recommended technic for relining the denture to obtain a reline which adheres to the denture base resin including (a) the use of separating media, (b) time of reseating the relined denture, (c) time of removal of denture to trim off excess resin, (d) the peak temperature and the time of its occurrence as determined in 4.3.2, (e) a statement of the hazards of retaining a large bulk of material in the mouth during the cure because of the possibility of a high temperature rise from the exothermic reaction and (f) the time to polish the relined denture.

4. SAMPLING, INSPECTION AND TESTING PROCEDURES

4.1 Sampling. Sampling of the relining resins shall be conducted as outlined in American Dental Association Specification No. 12 for Denture Base Resin.

4.2 Visual inspection. Visual inspection shall be used in determining compliance with requirements outlined in 3.1, 3.2, 3.4.1, 3.4.2, 3.4.3, 3.4.7 and 3.4.8.

4.3 Physical tests.

4.3.1 Consistency. The materials shall be mixed according to the manufacturer's

instructions at 23.0 ± 2.0°C. (73.4 ± 3.6°F.) and 50 ± 4 per cent relative humidity. When specific instructions are not available the materials shall be mixed for 30 seconds in a glass mixing jar with a stainless steel spatula. The mix shall be placed into a glass tube [10 mm. (0.39 in.) inside diameter, 0.5 ml. capacity] and 0.5 ml. of the slurry shall be expelled from it on a glass plate. A glass plate approximately 6 cm. (2.36 in.) square and weighing 10 to 12 Gm. shall be placed on top of the mix. Two minutes from start of the mix a 907 Gm. (2 lb.) weight shall be placed gently on the top glass plate for 5 minutes. Then the weight shall be removed and the major and minor diameters of the slumped resin shall be determined. The average value of the major and minor diameters of two determinations shall be recorded to the nearest 0.1 cm.

4.3.2 Temperature rise and hardening time. The materials shall be mixed as described in 4.3.1. The mixed slurry shall be placed immediately in a stainless steel ring [60 mm. (2.4 in.) inside diameter, 67 mm. (2.6 in.) outside diameter and 2 mm. (0.08 in.) high] which is supported on a flat dry glass plate 10.0 x 8.0 x 0.60 cm. (3.94 x 3.15 x 0.24 in.) kept at 23.0 ± 2.0°C (73.4 ± 3.6°F.) covered with polyethylene 0.025 mm. (0.001 in.) thick. Any excess reliner shall be removed and the assembly shall be placed in a 37 ± 2°C. (98.6 ± 3.6°F.) air bath at 100 per cent relative humidity. The hot junction of a thermocouple made from 30 gauge [0.25 mm. (0.010 in.)] wire shall be placed within 2 mm. (0.08 in.) of the center of the specimen with the leads of the thermocouple passing through two grooves cut in one side of the ring. The glass plate shall be marked so that the hot junction of the thermocouple can be centered. A sheet of polyethylene and a second glass plate of the same dimensions as the bottom plate shall be placed on top of the ring containing the slurry. Potentiometer readings shall be made at 30-second intervals beginning two minutes from start of the mix and terminating two minutes after the maximum temperature has been reached. The time at which this peak temperature occurs shall be noted. The values for temperature rise and time of peak temperature shall be reported as the average value for two specimens. The values for each specimen shall agree within ± 2.0°C. (3.6°F.) for peak temperature and ± 1 minute for the time at which the peak temperature is reached.

4.3.3 Hardness. Two specimens for determining Knoop numbers shall be prepared, stored and tested at 23.0 ± 2.0°C. (73.4 ± 3.6°F.) and 50 ± 4 per cent relative humidity. The slurry mixed as described in 4.3.1 shall be vibrated for 15 seconds to eliminate the air entrapped in the mix during spatulation and shall be poured into a gypsum mold 34 mm. (1.34 in.) long, 12 mm. (0.47 in.) wide and 1.5 mm. (0.059 in.) deep lined with aluminum foil. A strip of aluminum foil, a glass plate and a 2,000 Gm. (4.41 lb.) weight shall be placed on top of the mold. The cured specimens shall be removed from the mold 30 minutes after start of the mix. They shall be surfaced plane by fine grinding on metallographic papers. Final polishing shall be done on a metallographic lap using levigated alpha alumina on a low nap cloth. Knoop numbers shall be determined 21 to 27 hours after mixing using a 100 Gm. (0.22 lb.) load, 10 second descent and 20 second contact. Ten indentations shall be made on each specimen. The recorded value shall be the average of the 20 values obtained for both specimens.

4.3.4 Sorption. The water sorption test shall be made in duplicate on disks 50 ± 1 mm. (1.97 ± 0.04 in.) in diameter and 0.5 ± 0.1 mm. (0.02 ± 0.004 in.) thick (Fig. 12-3 American Dental Association Specification No. 12 for Denture Base Resin.) The resins shall be mixed as described in 4.3.1 and placed in a tin foil-lined (thickness of tin foil 0.025 mm.

[0.001 in.]) stainless steel die as described in American Dental Association Specification No. 12 for Denture Base Resin. The die shall be imbedded in gypsum in a flask. After closure the flask shall be compressed in a flask press. Thirty minutes from start of the mix the flask shall be removed from the press and the specimen trimmed. The procedure described in 4.3.3 of American Dental Association Specification No. 12 for Denture Base Resin shall be followed thereafter.

4.3.5 Solubility. The test shall be conducted as described in American Dental Association Specification No. 12 for Denture Base Resin under 4.3.3.

5. PREPARATION FOR DELIVERY

The packaged resin shall conform to the requirements of Section 5 of American Dental Association Specification No. 12 for Denture Base Resin with the exception of the last sentence of 5.2.3.

Supplement to List of Certified Dental Materials

COUNCIL ON DENTAL RESEARCH

ADDITION • Since publication of the most recent List of Certified Dental Materials, revised to July 1, 1961 (J.A.D.A. 63:154 July 1961), the following materials which conform to American Dental Association Specification No. 2 for Dental Inlay Casting Investment and American Dental Association Specification No. 14 for Dental Chromium-Cobalt Casting Alloys have been added.

CERTIFIED DENTAL INLAY CASTING INVESTMENT
(A.D.A. SPECIFICATION NO. 2)

Investment	*Manufacturer or distributor*
Shiny-Brite Cristobalite	Whip-Mix Corporation

CERTIFIED DENTAL CHROMIUM-COBALT CASTING ALLOYS
(A.D.A. SPECIFICATION NO. 14)

Material	*Manufacturer or distributor*
Niranium Alloy	Niranium Corporation

Cooperation between state councils on dental health and state units of A.S.D.C.

COUNCIL ON DENTAL HEALTH

In the American Dental Association's historic statement of 1949, "A Dental Health Program for the Community, State and Nation,"[1] seven objectives were listed for a community dental health program. Of these, two placed special emphasis on dentistry for children: to "stimulate the development of resources for making dental care available to all children and youth" and to "stimulate all dentists to perform adequate dental health services for children." Another specified enlistment of "the aid of all groups and agencies interested in the promotion of health" for any type of community dental health program.

In accordance with the foregoing objectives, the Council on Dental Health welcomed the recent request of the committee on community dental health programs of the American Society of Dentistry for Children for a closer working relationship with the Council. The accompanying statement, prepared at the request of the Council, describes areas of mutual interest and, more importantly, the potential for active cooperation between the counterparts of the two agencies at the state level where the actual programs would be developed. The Council hopes that state society councils on dental health will give consideration to implementing the recommendations in Dr. Bushel's report.

THE AMERICAN SOCIETY OF DENTISTRY FOR CHILDREN
COMMITTEE ON DENTAL HEALTH PROGRAMS

Arthur Bushel, D.D.S., New York City*

About a year ago the Committee on Community Dental Health Programs of the American Society of Dentistry for Children was given the assignment of thinking through its legitimate areas of interest and, on that basis, planning a program of action. Our general approach is, perhaps, best reflected in the following introductory paragraphs from our committee's first report:

The very existence of a Committee on Community Dental Health Programs testifies to the broad interest of the ASDC in a public health approach to the problem of finding and closing the gaps between the knowledge we have for preserving the dental health of our children and current limitations in the application of that knowledge. The major gaps with which we are confronted are not difficult to define. They have been the subject of much talk, many papers, several workshops and mounting reports. We want to encourage the

extension of water fluoridation for automatic caries prevention. We want to encourage dentists to make greater use of topically applied fluoride and to urge parents to seek such preventive service. We are interested in community programs of education aimed at raising the priority parents give to dental care for their children and making them and the children themselves aware of what they should be doing in the way of proper home care and diet. We are properly concerned with the potential of the prepayment mechanism as a possible contributor toward making dental care more accessible to more children. And we are interested in the extraordinary dental problems posed by special groups of children, such as the physically and mentally handicapped.

In short, to conceive and even to develop a comprehensive list of activities legitimately related to community dental health programs would not be a particularly difficult task. The real challenge, however, is to come up with a realistic program for this committee. We are, in the last analysis, a very part-time and very decentralized committee of members who have other major interests including that of earning a livelihood. From this viewpoint alone, without going into limitations of talent or any other considerations, it seems wise that we formulate a modest program of priority activities through which we can best serve the membership of the ASDC and best contribute to sounder community health programs for children.

In such deliberation we must go beyond concern with our own interests and talents. We must also take into account other groups in the fields of dentistry and public health whose interest and activities overlap ours and of whom we may therefore take advantage. (Please note: we have avoided the use of such words as "integration," "coordination," "duplication," and "liaison.")

The report goes on to discuss three major areas of interest and potential activity: (1) keeping the ASDC membership aware of major developments and issues in the field and soliciting appropriate action and support (by the ASDC); (2) maintaining contact and communication with other related dental and public health groups, and (3) investigating specific aspects of community dental health programs with a view to establishing sound policies and improving standards.

This approach has led to several observations and specific recommendations. Perhaps most important among these are those which have to do with the relationship between the ASDC Committee on Community Dental Health Programs and the American Dental Association's Council on Dental Health. The central fact is that the purposes of these two groups are strikingly similar except that the ASDC committee has a special, perhaps vested, interest in children. An alternate interpretation is that the Council on Dental Health largely includes among its functions those of the Committee on Community Dental Health Programs.

This observation would seem to lead to one of two conclusions: either our committee on community programs should be dissolved as serving no useful independent function, or it should establish an extremely close working relationship with the Council on Dental Health. We happily choose the second alternative. It seems to us that the American Society of Dentistry for Children itself performs a useful function in providing a forum for dentists with a special interest in dentistry for children and in exerting special influence in advancing this cause. Through our committee on community programs it seems reasonable to exploit this special interest of ASDC members by keeping them informed of and enlisting their support for activities which represent a common concern with the American Dental Association's Council on Dental Health.

The character of our proposed relationship with the Council on Dental Health represents a combination of philosophy and facts of life. The philosophic consideration relates to the conviction that, whereas such "splinter groups" as the ASDC perform a useful and necessary function, it would not be in the best interests of dentistry for such groups to take over or to dilute the efforts and the influence of the American Dental Association. Whether the point at issue is the promotion of water fluoridation or the

effort to achieve passage of Senator Hill's pending dental grants-in-aid bill, the American Dental Association should continue to carry the ball; and those with special interest will be most effective by supplementing the A.D.A. activity rather than by "going into business for ourselves."

The "facts-of-life" consideration is that such a group as our community programs committee is equipped by neither funds nor staff to do the kind of job which our parent organization, the A.D.A., continues to do so well. We hasten to add that our committee still retains its usefulness in maintaining communication with the ASDC membership and in conducting activities of unique or dominant interest to the ASDC.

Accordingly, we come to the conclusion that a very close relationship should be developed between the A.D.A. Council on Dental Health and the ASDC Committee on Community Dental Health Programs. The achievement of such a relationship at the national level would be a simple matter, the very publication of this item itself testifying to healthy progress. Potentially more important, however, is the creation of a closer and even a formal relationship between state councils on dental health and state units of the American Society of Dentistry for Children. It is our suggestion and our plea that each state council on dental health invite its state society of dentistry for children to appoint a representative who would serve the council in a consultant, advisory, liaison or participating capacity. Such an arrangement seems justified by our large areas of mutual interest. This mutual interest is attested to by the fact that, in many states, dentists active in the Society of Dentistry for Children have been members of their state councils on dental health. It would seem well to formalize and to extend this relationship not so much to promote dentistry for children but, rather, to maintain a proper balance between legitimate special interest and the common dental good.

*Director, Bureau of Dentistry, New York City Department of Health; chairman, committee on community dental health programs, The American Society of Dentistry for Children.

1. American Dental Association transactions, 1949, p. 264.

Additions to the Library

BUREAU OF LIBRARY AND INDEXING SERVICE

The books listed here have been added recently to the Bureau collection. Requests for this material, available on loan to all members of the Association, should be addressed to the Bureau of Library and Indexing Service. There is no charge for borrowing books, but there is a minimal charge of one dollar ($1.00) for each package library. Illinois residents add 4 per cent Retailers Use Tax. (This applies also to the purchase of books.) Practically all the dental journals published in the world at present are available to members on loan. Lists of books, package libraries and journals are available on request.

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UNIVERSIDAD DE SAN CARLOS DE GUATEMALA, FACULTAD DE ODONTOLOGIA, BOLETIN, (Guatemala City)

1961

H. S. Eberhardt
MINNESOTA

E. F. Huckaba
TENNESSEE

E. R. Johnson
TEXAS

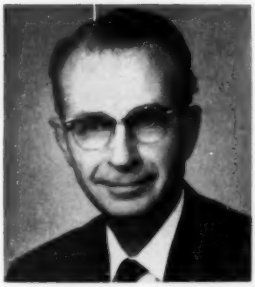
EDWARD F. HUCKABA, a general practitioner in Chattanooga, is president of the Tennessee State Dental Association. He graduated from Draughan's Business College in Nashville in 1919, and received a D.D.S. degree from the Vanderbilt University Dental College in 1924. Dr. Huckaba won a varsity letter in baseball at Vanderbilt. He has held all offices in the Third District Dental Society and has served as a trustee of the state association. A Fellow of the American College of Dentists, Dr. Huckaba also holds membership in the Pierre Fauchard Academy, South Eastern Academy of Prosthodontists, American Denture Society and Delta Sigma Delta. Dr. Huckaba is a member of the First Baptist Church in Chattanooga. He holds membership in the Chattanooga Chamber of Commerce, Elks Club, Chattanooga Golf and Country Club, the Chattanooga Cancer Society and has served for 20 years on the board of directors of the Y.M.C.A. Dr. Huckaba is married and the father of two sons, both of whom are dentists—John Edward Huckaba, in general practice in Chattanooga, and Richard Webb Huckaba, in general practice in Augusta, Ga.

EMMETT R. JOHNSON, president of the Texas Dental Society, is a general practitioner in Dallas. He received his D.D.S. degree in 1924 from Baylor College of Dentistry. A Fellow of the American College of Dentists, Dr. Johnson has served as president of the Dallas County Dental Society. He is a member of the Texas Board of Dental Examiners, American Academy of Restorative Dentistry, the American-International of Dentistry, Omicron Kappa Epsilon, Dallas Chamber of Commerce, Lakewood Country Club, Downtown Club, Dallas Salesmanship Club (for underprivileged boys), Scottish Rite, and the East Dallas Christian Church. Dr. Johnson has served on the faculty of the Baylor College of Dentistry. He is married. His hobbies are hunting, fishing and golfing.

HAROLD S. EBERHARDT, president of the Minnesota State Dental Association, is a general practitioner in Minneapolis. He received his D.D.S. degree in 1931 from the University of Minnesota. He has filled practically all offices in the Minneapolis District Dental Society, having served as president in 1952. In 1952, 1960 and 1961 he served as a member of the House of Delegates, American Dental Association. He holds membership in the following organizations: Minnesota Dental Foundation, Minnesota Academy of Restorative Dentistry, Fédération Dentaire Internationale, International College of Dentists, St. John's Lutheran Church, Minneapolis Athletic Club, Boy Scouts of America, Young Men's Christian Association, University Club, and Tau Kappa Epsilon. Dr. Eberhardt is married and the father of three children: Burgess M., 20, Harold R., 18, and Elizabeth Ann, 15. His hobbies are boating, puttering in the yard and vacationing in his cabin in Canada.

L. B. Schoel
OREGON

D. L. Smith
KANSAS



F. C. Bates
MASSACHUSETTS

State Dental Association Presidents

FRANCIS C. BATES is president of the Massachusetts Dental Society. A general practitioner in Milton, he received his D.M.D. degree from Harvard University School of Dental Medicine in 1919. Dr. Bates is president of the Harvard Odontological Society and a past president of the Milton Rotary Club. He served as secretary of the South Shore District Dental Society for ten years. He is a member of the American Academy of Dental Science, Milton Lodge A.F. and A.M., Delta Sigma Delta, Milton Town Club, Milton Chamber of Commerce and Quincy Neighborhood Club. For 18 years he served as chairman of the Milton School Committee. He has practiced in Milton for 36 years. Dr. Bates has a summer home in Dennis, Mass. He is married. His hobbies are photography and radio.

LOUIS B. SCHOEL, president of the Oregon State Dental Association, is a general practitioner in Portland. He received his D.M.D. degree in 1931 from the University of Oregon Dental School. He is a member of the American Academy of Restorative Dentistry, American Academy of Gold Foil Operators, University of Oregon Alumni Association (was program chairman in 1956) and Al Kadar Shrine. From 1959 to 1961 he served as associate professor in the periodontia department of his alma mater. He has served as a clinician in two gold foil study clubs and a prosthetic study club. He is married and the father of two children, Joannie, 18, and Molly, 13. His hobbies are woodworking and photography.

DWIGHT L. SMITH, a general practitioner in McPherson, is president of the Kansas State Dental Association. Dr. Smith received his D.D.S. from the University of Kansas City in 1929. He is past president of the McPherson Dental Society and the Central District Dental Society, and a member of the executive council of his state association. Dr. Smith is a member of the American Denture Society and the Pierre Fauchard Academy, and an associate member of the Chicago Dental Society. He holds membership in the Rotary Club, Elks Club, American Legion, Chamber of Commerce and the McPherson Country Club; he is a member of Delta Sigma Delta, Omicron Kappa Upsilon, and the American Society of Psychosomatic Dentistry and Medicine. Dr. Smith served in the U.S. Navy Dental Corps from 1943 to 1946, and was discharged with the rank of lieutenant commander. He is a member of the Hutchinson (Kan.) Dental Study Club, and from 1955 to 1961 has served as chairman of the fluoridation committee of the Kansas State Dental Association. Dr. Smith has two children, Stephen George, 18, and Beverly Ann, 14.

editorials

Journal advertising: for the promotion and protection of public health

Most readers of THE JOURNAL will have noticed, within recent months, the decided increase in the number of its pages devoted to advertising. This increase is complimentary: complimentary to THE JOURNAL itself for its high scientific and advertising standards; complimentary to readers of THE JOURNAL for their judgment and business acumen and complimentary to the manufacturers and agents for their good judgment in recognizing that THE JOURNAL is by far the best medium through which to reach their best market.

The recent increase in THE JOURNAL'S advertising section is particularly gratifying because (1) it has been achieved in the face of a business recession in which most business publications were showing declines of from five to ten per cent from 1960 levels, and (2) the advertising standards of THE JOURNAL are so high that they exclude many products from its pages. It is unlikely that the standards of THE JOURNAL are surpassed by any other scientific publication in America. To secure the privilege of advertising in any of the publications of the Association, a product and the claims made for it must meet the most rigid requirements.

The preamble to the *Principles of Ethics* of the Association provides the basis for these requirements:

"The practice of dentistry first achieved the stature of a profession in the United States where, through the heritage bestowed by the efforts of many generations of dentists, it acquired the three unfailing characteristics of a profession: education beyond the usual level, the primary duty of service to the public and the right to self-government."

Particular attention is directed to the second of these characteristics: "the primary duty of service to the public." If this obligation is to be fulfilled by the Association,

it is obvious that its publications, no less than its members, must observe ethical standards. The Principles of Ethics are not content to dismiss the subject of professional responsibility with a simple statement in a preamble. Concerning the prescription and use of drugs and other therapeutic agents offered to the profession, the Principles are most specific:

"The dentist has an obligation not to prescribe, dispense or promote the use of drugs or other agents whose complete formulae are not available to the dental profession. He also has the obligation not to prescribe or dispense, except for limited investigative purposes, any therapeutic agent, the value of which is not supported by scientific evidence."

If the Principles of Ethics are to guide the conduct of Association members, they can do no less than guide the conduct of Association publications—which they do. The Advertising and Exhibit Standards adopted in 1953 by The House of Delegates of the Association are established to contribute to the promotion and protection of public health. To this end, both the text of the advertising itself and the texts, methods and materials used in the promotion of a product or service are used as measures of eligibility for advertising and exhibit. Any product or service is eligible for advertising and exhibiting in publications and meetings of the American Dental Association under the following conditions:

1. The advertising, exhibit or promotion of a product shall not violate, or assist in violating, any dental practice act or other governmental regulation or statute.

2. The advertising, exhibit or promotion shall not relate to products or services which have been adjudged worthless, dangerous, or of secret composition, by official action of appropriate agencies or consultants of the American Dental Association.

3. The advertising, exhibit or promotion shall not include claims of a type which have been the subject of unfavorable decision by the Federal Trade Commission or the Food and Drug Administration.

4. The advertising, exhibit or promotion may not relate to a product which is considered for acceptance by the Council on Dental Therapeutics of the American Dental Association and which has not been classified or which has been placed in Class C or D by official action of that agency.

5. The advertising, exhibit or promotion may not state or imply that a dentist or physician is in any way connected with the product or service, except that this restriction shall not apply to textbooks and other printed material produced for professional purposes.

6. The advertising, exhibit or promotion used in other media shall be consistent with the spirit and letter of these standards.

Strict adherence to these standards by THE JOURNAL assures the reader that JOURNAL advertising can be relied upon. Because of this fact more and more advertisers are endeavoring to reach members of the dental profession through THE JOURNAL pages. That is why THE JOURNAL'S advertising section continues to grow in volume and in usefulness to the profession.

Surgeon General urges an increase in drive for fluoridation: promises his full support

The lull which has prevailed for the past several months in the nation's fluoridation activities appears to be nearing an end. Evidence substantiating the dental benefits of fluoridation continues to mount as does evidence concerning its safety. Dental societies in nonfluoridated areas are becoming increasingly critical of their community officials for depriving their children of this dental health measure and more public health officials on local, state and national levels are voicing their approval of the process. High in that category is Luther L. Terry, M.D., Surgeon General, Public Health Service, U.S. Department of Health, Education, and Welfare.

Addressing the Twelfth National Dental Health Conference in Chicago last spring, Dr. Terry expressed his concern over the "startling—and disturbing" fact that only a third of America's urban population receives community protection against dental caries[1]—this despite the fact that ten years has elapsed since the fluoridation of public water supplies received the approval of the nation's principal health organizations. Declaring fluoridation to be, beyond question, the most economical means available for the prevention of dental caries, "tested, highly efficient and completely safe for all age groups," he urged national, state and local leaders to return to the attack this year with a firm purpose. The United States Public Health Service intends to increase its efforts in this field and will "with the help of professional groups, state and local health agencies go after fluoridation until it receives the widest possible application."[2]

Assured of such support, the dental profession can do no less than to shift its fluoridation program into high gear and drive forward.

In shifting into high gear the professions must also shift their line of attack. As Donald R. McNeil pointed out at the Twelfth National Dental Health Congress, the fight over fluoridation has now shifted from the scientific to the political arena. The evidence regarding the benefits and safety of fluoridation has won scientific acceptance everywhere but in the mind of the public. "We cannot escape the fact that fluoridation has been wrested from the hands of the scientist and deposited squarely in the middle of the political arena. We are striving to reach the minds of men so that they will take political action."[3]

In order to reach the minds of men in Dr. Terry's proposed new national drive for fluoridation, a thorough evaluation should be made of the scare propaganda used by the antifluoridationists. For the most part such propaganda consists of elaborations on a few basic arguments, none of which is scientifically sound. Used by a skillful debater, however, each can be made to sound scientific. And each can be filled with

emotional appeal to both the public and the politician. Counter arguments should then be prepared based on scientific fact that will have as much, or more, emotional appeal as those used by the antifluoridationists.

Certainly the health professions, with their scientific knowledge and their public educational know-how, are capable of countering with easily understood, well-documented arguments, the fallacious claims of those who would deprive children of this approved dental public health measure.

The challenge of Surgeon General Terry to renew the battle for fluoridation must not go unanswered. Neither must the advice of Dr. McNeil that henceforth the battle must be waged not in the halls of science and in terms meaningful to the scientist but in the arena of politics and in terms political leaders can understand.

1. Editor's note: As of January 1, 1961, 1,968 communities in the United States were fluoridating water supplies serving 38,477,000 people. In addition more than 7 million people were using water with a natural fluoride content of the approximate recommended level. Communication, Public Health Service, U.S. Department of Health, Education, and Welfare to the Council on Dental Health, American Dental Association, July 24, 1961.

2. Terry, Luther L. The next great areas for teamwork in national health. J.A.D.A. 63:183 Aug. 1961.

3. McNeil, Donald R. Time to walk boldly. J.A.D.A. 63:333 Sept. 1961.

Third National Dental Civil Defense Conference: dental society officers urged to attend

The Third National Dental Civil Defense Conference is to be held at the Sheraton Hotel, Philadelphia, on October 14, 1961, prior to the opening of the 102nd annual session of the Association. All dental society officers and others interested in the welfare of the country are urged to attend. Indeed, the mounting tensions in Europe's eastern area make attendance almost a must for responsible dental society officers.

For ten years the nation has had a civil defense program but for ten years the program has been largely on paper. It is high time, in the opinion of President Kennedy, that these plans be transformed from blueprints into action. In his message to Congress May 25, 1961, the President said:

"One major element of the national security program which this nation has never squarely faced up to is civil defense. This problem arises not from present trends, but from national inaction in which most of us have participated. In the past decade we have intermittently considered a variety of programs, but we have never adopted a consistent policy. Public consideration has been largely characterized by apathy, indifference, and skepticism; while, at the same time, many of the civil defense plans have been so far-reaching and unrealistic that they have not gained essential support."

He then proceeded to advise Congress and the nation that nonmilitary preparedness would no longer be accorded only token support by the federal government; that

a crash program of positive action was required in order to insure the people against "the possibilities of an irrational attack, a miscalculation, an accidental war, or a war of escalation in which the stakes by each side gradually increase to the point of maximum danger which cannot be either foreseen or deterred."

This pronouncement by the President, and the executive and legislative supportive actions which followed it, offer encouragement that perhaps, at long last, a vital and cohesive influence will be brought to bear on the welter of disoriented plans and programs that have characterized past efforts in the field of civil defense.

The American Dental Association welcomes the introduction of this influence. For ten years it has had an agency responsible for civil defense matters as have the state and many local dental societies. Little more than token action, however, has been taken by the profession largely because little more than token leadership has been taken by civic authorities.

Last year the Association reaffirmed its recognition of dentistry's responsibility in the country's civil defense program. The House of Delegates, in October 1960, adopted a series of resolutions dealing with dental participation in civil defense. Included among them was a Statement on Disaster Medical Care Responsibilities and an endorsement of the Family Fallout Shelter Program of the federal government. These official policies of the Association are published on page 526 of this issue.

The present tense state of international relations would seem to indicate that this would be a particularly appropriate time for each member of the profession to evaluate critically the extent of his contribution to nonmilitary defense, using as guidelines the afore-mentioned policies. The dental profession has the capacity to contribute significantly to the furtherance of the security of the nation. The fulfillment of that capacity, however, will depend directly on the degree to which each individual member of the profession accepts his responsibility as a respected community leader.

news of dentistry

National hygiene board approved by Board of Trustees

The Board of Trustees, at its summer session held at the Central Office in Chicago, August 24-27, considered resolutions and proposals which will be acted on by the House of Delegates when it meets in Philadelphia, October 16-19. Among important actions taken by the Board was preliminary approval of the establishment of a national board for dental hygienists. Final action on this matter will be taken by the House of Delegates.

In response to a resolution which the House of Delegates will consider at Philadelphia, the Board resolved to invite representatives of the Federal Dental Services to meet with a committee of the Board in October to discuss the establishment of a Trustee District 14 to be composed of the Air Force, Army and Navy dental corps, the Public Health Service and the Veterans Administration.

The Board also:

Urged the Council on Federal Dental Services to support the Council on Legislation in its efforts to remedy the deficiencies in the administrative authority of the Army and Air Force dental services. It also urged the Council on Federal Dental Services to continue its efforts to increase interest in civil defense;

Commended the Council on Federal Dental Services for alerting the deans of dental schools to the possibility of an induction call for dentists. This action resulted in a sufficient number of students volunteering to meet the Armed Forces' requirements;

Expressed appreciation to Rear Adm. Daniel W. Ryan for his contributions to dentistry during his career as a naval dental officer. Admiral Ryan served as chief dental officer of the Navy from 1952 to 1955. Subsequently, he served as inspector of naval dental activities, Pacific Coast. In 1956 he was decorated by the Republic of Panama for his leadership in the profession. He retired from active duty in 1960;

Resolved to appoint 25 delegates and 25 alternates to the International Dental Congress in Cologne, Germany, July 7-14, 1962, provided that the American Dental Association will not bear any expense in relation to such appointments;

Recognized the contributions of Arthur H. Merritt, Association president from 1939 to 1940, to the Bureau of Library and Indexing Service. Dr. Merritt's $5,000 bequest will be used for the collection of rare and historical books. During his lifetime, Dr. Merritt made many contributions to the Association's library;

Transmitted to the House of Delegates approval of the Association's support in principle of the Youth Physical Fitness program of President Kennedy's Council on Youth Fitness and encouraged constituent and component societies to cooperate with the appropriate agencies toward the development of effective programs for improvement of health;

Approved a grant of $7,375 to the American Association of Dental Schools for a Workshop on Dental Manpower and Effective Utilization of Auxiliary Personnel to be conducted by the University of Michigan in cooperation with the American Dental Association and the American Association of Dental Schools with partial financial support from the W. K. Kellogg Foundation;

Authorized the appropriation of $500 for a grant to the University of Miami School of Medicine in support of the program undertaken by that institution for the retraining of Cuban refugee dentists;

Approved the dissolution of the Inter-Association Committee on Health and authorized the participation of the secretary and one member of the staff in informal joint staff meetings with the staffs of the American Hospital Association, American Medical Association, American Nurses Association, American Public Health Association and American Public Welfare Association, and provided for the retention of the unexpended funds of the committee belonging to the Association on a pro-rata basis to defray the costs of the successor joint staff conferences;

Authorized the administrators of the group life insurance program to establish a third reserve, effective January 1, 1962, to be called the bonus addition reserve and to be distributed as a bonus addition to incurred death claims;

Approved the addition of an extended disability coverage benefit to the group accident and health insurance program, effective November 1, 1961;

Authorized the enlargement of THE JOURNAL OF THE AMERICAN DENTAL ASSOCIATION by 32 black and white pages to provide additional space for more scientific articles and other items of current interest. The extra 32 pages will be added to each of the remaining issues to be published in 1961 and each of the 12 issues to be published in 1962;

Noted that a dental prepayment plan for Association employees will be initiated on January 1, 1962. This will be the fourth dental prepayment plan established in the United States as a result of the continued interest of the Association in such methods of prepayment.

DENTAL HYGIENE BOARD

In the action previously cited, the Board of Trustees approved the *Memorandum of Agreement* between the Association and the American Dental Hygienist's Association for a national board program for dental hygiene conducted by the Council of National Board of Dental Examiners, pending appropriate revision of the Council's duties in the *Bylaws* by the House of Delegates.

In a review of the Association's policy on "soft drinks" the Board resolved to continue the present policy since there is no adequate, direct clinical evidence to indicate that consumption of commercial, sugar-containing beverages does not cause a substantial increase in the incidence of tooth decay in children 6-18 years of age.

The Board received a report on the *Summary Report of Dentistry in the United States* which was published in October, 1960. To date, 22,000 copies have been printed of which 11,160 have been distributed free and 4,477 have been sold. It is being translated into Spanish and Portuguese, which versions will be distributed to Latin American dental schools with the aid of $1,200 in unexpended funds belonging to the survey. The *Survey of Dentistry* was published in March, 1961, with 2,032 copies distributed free world-wide and 229 copies sold.

OTHER BOARD ACTIONS

In additional actions, the Board appointed consultants to the various Association Councils for terms ending with the 1962 session. Those appointed to the National Board of Dental Examiners were:

Arthur N. Bahn, Chicago; Desmond D. Bonnycastle, Jersey City, N.J.; Nicholas J. Brescia, Chicago; Donald E. Cooksey, Bethesda, Md.; George Easton, Iowa City; Alton K. Fisher, Iowa City; Rebekah A. Fisk, Indianapolis; Edward J. Forrest, Chicago; Stephen P. Forrest, St. Louis; Eduard G. Friedrich, Chicago; James A. Gagnon, Chicago; Arthur F. Grimm, Chicago; William E. Hahn, Baltimore; Warren J. Hedman, Great Lakes, Ill.; Walter Hess, District of Columbia; Louise W. Hord, Boston; Marjorie Houston, Chicago; F. Lloyd Jacobson, Seattle; Lucille Klein, Detroit; S. Wah Leung, Pittsburgh; Frederick M. Liebman, New York; William B. Martin, Denver; Marion W. McCrea, Philadelphia; George H. Moulton, Atlanta; Ralph W. Phillips, Indianapolis; Richard F. Rabe, Des Moines, Iowa; Otto H. Reisser, New York; René Rochon, Detroit; Margaret Ryan, Seattle; John J. Salley, Richmond; Erwin M. Schaffer, Minneapolis; Arthur Schmidt, San Juan; Raymond W. Shaddy, Omaha, Neb.; William G. Shafer, Indianapolis; James H. Shaw, Boston; Harold Shryock, Loma Linda, Calif.; Harry Sicher, Chicago; Eugene W. Skinner, Chicago; Violette C. Sutherland, San Francisco; Boyd W. Tarpley, Birmingham, Ala.; H. Henry Weisengreen, San Francisco, and Ned B. Williams, Philadelphia.

Those named to the Council on Dental Research were:

Wallace D. Armstrong, Minneapolis; David B. Ast, Albany, N.Y.; Herbert D. Ayers, Jr., Flushing, N.Y.; Joseph L. Bernier, Washington, D.C.; James A. English, Buffalo, N.Y.; Thomas J. Hill, Brecksville, Ohio; Harold C. Hodge, Rochester, N.Y.; Seymour J. Kreshover, Bethesda, Md.; Robert J. Nelsen, Rockville, Md.; Floyd A. Peyton, Ann Arbor, Mich.; Ralph W. Phillips, Indianapolis; Albert G. Richards, Ann Arbor, Mich.; Reidar F. Sognnaes, Los Angeles; Kenneth H. Strader, Toledo, Ohio; Carl J. Witkop, Jr., Bethesda, Md.; Wendell L. Wylie, San Francisco, and Seymour H. Yale, Chicago.

Named as consultants to the Council on Dental Therapeutics were:

J. Roy Blayney, Evanston, Ill.; N. W. Chilton, Trenton, N.J.; Miss Mary C. Crowley, Ann Arbor, Mich.; Edward J. Driscoll, Bethesda, Md.; Harrison Flippin, Philadelphia; Count Gibson, Jr., Boston; Robert M. Grainger, Toronto, Canada; Stanley C. Harris, Chicago; James R. Hayward, Ann Arbor, Mich.; Walter Hess, Washington, D.C.; Niels B. Jorgensen, Loma Linda, Calif.; Irvin Kerland, Washington, D.C.; Leonard M. Monheim, Pittsburgh; Max Sadove, Chicago, and Ned B. Williams, Philadelphia.

Those approved as consultants to the Council on Dental Education were:

Philip E. Blackerby, Jr., Battle Creek, Mich.; Leroy R. Boling, St. Louis; John C. Brauer, Chapel Hill, N.C.; Leslie M. FitzGerald, Dubuque, Iowa; Don W. Gullett, Toronto, Canada; William E. Hahn, Baltimore; Miss Ione M. Jackson, Minneapolis; Miss Lois Kryger, Seattle; Ralph E. McDonald, Indianapolis; Harold W. Oppice, Chicago; Walter J. Pelton, Washington, D.C.; Leroy W. Peterson, St. Louis; Shailer Peterson, Memphis; Paul A. Slone, Washington, D.C.; Ray V. Smith, Iowa City; Reginald H. Sullens, Chicago; Miss Margaret E. Swanson, Chicago, and George W. Teuscher, Chicago.

Paul W. Zillmann, Buffalo, N.Y., was named consultant to the Council on Insurance, and consultants named to the Council on Dental Trade and Laboratory Relations were: William L. Frederick, New York; Don W. Gullett, Toronto, Canada, and Bernard J. Beazley, York, Pa.

Consultants appointed for the Council on Hospital Dental Service were:

Joseph R. Anderson, Chicago; Kenneth B. Babcock, Chicago; Madison B. Brown, Chicago; Edward C. Thompson, Urbana, Ill., and Leland E. Weyer, Front Royal, Va.

Approved as consultants to the Council on Dental Health were:

John F. Abel, Chicago; Pearl Bierman, Chicago; John W. Castellucci, Chicago; Keith G. Cone, Chicago; Kenneth A. Easlick, Ann Arbor, Mich.; J. F. Follmann, Jr., New York; Donald J. Galagan, Washington, D.C.; Irving R. Hardy, Boston; Robert L. Jorgensen, Chicago; Noel Kaho, Claremore, Okla.; T. Leroy Martin, Chicago; Gerald L. St. Marie, New Haven, Conn.; Sidney I. Silverman, New York; E. Todd Wheeler, Chicago, and Wesley O. Young, Boise, Idaho.

Consultants named to the Council on Federal Dental Services were:

Russell W. Bunting, Ann Arbor; John G. Carr, Camden, N.J.; Thomas P. Fox, Philadelphia; Arthur R. Frechette, Bethesda, Md.; Richard L. Hayes, Washington, D.C.; James R. Jensen, Minneapolis; Lawrence I. Kerr,

Endicott, N.Y.; Phelps J. Murphey, Dallas; Harold W. Oppice, Chicago, and Clemens V. Rault, Washington, D.C.

Appointed as consultants to the Council on International Relations were: Philip E. Blackerby, Battle Creek, Mich.; Mario M. Chaves, Washington, D.C.; John M. Frankel, Chicago, and Obed H. Moen, Watertown, Wis.

The board appointed the following associate editors and members of the editorial board of the JOURNAL OF ORAL SURGERY, ANESTHESIA AND HOSPITAL DENTAL SERVICE for terms of three years: oral surgery associate editor—Robert B. Shira, Washington, D.C.; anesthesia associate editor—Bruce L. Douglas, Berkeley, Calif.; editorial board members—Lyall O. Bishop, Walnut Creek, Calif.; James R. Hayward, Ann Arbor, Mich., and Fred A. Henny, Detroit. Robert V. Walker, Dallas, was appointed to the editorial board to succeed Richard J. Burch, Tucson.

The Board named the following as vice-chairmen of sections: complete prosthodontics—Lloyd G. Parry, Atlanta; pedodontics—William Kramer, Lincoln, Neb., and practice administration—Elbert Thompson, Salt Lake City.

The Board also appointed as advisers to the Council on Legislation the chairmen of the legislative committees of the constituent societies. They are: Alabama—William L. McCarty, Montgomery; Alaska, Clayton L. Polley, Juneau; Arizona—Ralph L. Koerner, Phoenix; Arkansas—Roy F. Golden, Little Rock; California—Charles F. Gray, Sacramento; Southern California—J. C. Almy Harding, San Diego; Colorado—Bruno A. DeRose, Denver; Connecticut—Philip T. Sehl, Wethersfield; Delaware—Joseph S. C. Mach, Seaford; District of Columbia—Steven O. Beebe, Washington; Florida—Robert B. Hughlett, Tampa; Georgia—Robert Jordan, Hawaii—George L. Dobson, Honolulu; Idaho—Paul H. Poulson, Boise; Illinois—Leonard W. Esper, Jr., Springfield, and Paul W. Clopper, Peoria; Indiana—George W. McDaniel, Bloomington, and Herbert W. Mason, Indianapolis; Iowa—Joseph B. Kennedy, Des Moines; Kansas—Newell O. Feeley, Topeka; Kentucky—John A. Atkinson, Louisville; Louisiana—Newell G. Monget, Jr., Baton Rouge, and Alfred E. Smith, New Orleans; Maine—Alva S. Appleby, Skowhegan; Maryland—David Lewis, Wheaton; Massachusetts—Walter L. Cronin, Cambridge; Michigan—John G. Nolen, Lansing; Minnesota—Philip H. Moos, St. Cloud; Mississippi—John C. Boswell, Jackson; Missouri—Roy W. Osterkamp, St. Louis; Montana—Henry B. Lorentz, Great Falls; Nebraska—Leland D. Arnot, Lincoln, and C. C. Lillibridge, Crete; Nevada—Walter R. Bell, Reno; New Hampshire—John E. Story, Dover; New Jersey—Frank J. Farrell, South Amboy, and James D. Battaglia, Westfield; New Mexico—Ralph R. Lopez, Santa Fe; New York—Frank E. Nicklaus, Bath; North Carolina—H. Royster Chamblee, Raleigh; North Dakota—Rudolph L. Bork, Williston; Ohio—Raymond L. Cummins, Columbus; Oklahoma—John N. Miles, Norman; Oregon—William H. Burrell, Salem, and William W. Howard, Portland; Pennsylvania—Harry T. Rensel, Harrisburg; Puerto Rico—Alberto Tomas-canseco, Hato Rey; Rhode Island—Peter T. Kanelos, Providence; South Carolina—Charles A. Vassy, Columbia; South Dakota—James W. Anderson, Aberdeen; Tennessee—Ewing J. Threet, Manchester; Texas—Joe C. Carrington, Jr., Austin; Utah—Harold E. Nelson, Midvale; Vermont—William P. Guthman, Morrisville; Virginia—David M. Baer, Richmond; Washington—Howard B. Henderson, Bremerton, James O'Banion, Vancouver, and William H. Fisher, Tacoma; West Virginia—Ward T. Sturm, Fairmont; Wisconsin—James D. Kelly, LaCrosse; Wyoming, John Alexander Duthie, Cheyenne.

The next meeting of the Board of Trustees will be October 11-14 at the Sheraton Hotel in Philadelphia. On October 19, the new Board will meet following adjournment sine die of the House of Delegates.

Association Affairs

ASSOCIATION STAFF RECEIVES DENTAL INSURANCE JANUARY 1

Association employees and their dependents will be covered by dental insurance starting January 1, 1962. The insurance program will be similar to the pioneering plan established in 1959 by the Continental Casualty Company for the employees of Dentists' Supply Company, York, Pa. The Association plan also will be operated by Continental.

Under the program, all types of dental services will be covered with the exception of purely cosmetic dentistry or services covered by other health insurance. Any licensed dentist may be chosen, and

he may charge his customary fee; there is no fee schedule or table of allowances. The Association will pay the entire annual premium. Employees will share in the cost of dental care, paying from 20 to 40 per cent, depending on the type of dental service needed.

PATIENTS' EDUCATIONAL AID AVAILABLE TO DENTISTS

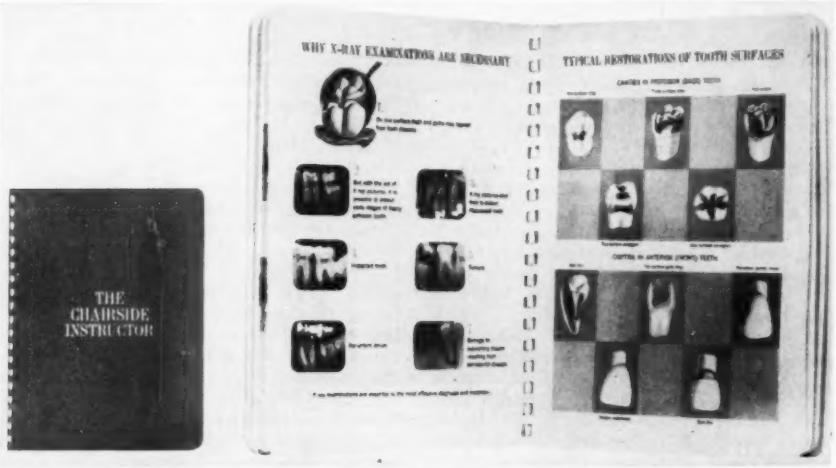
A new educational aid, "The Chairside Instructor," is now available to dentists from the Association's Bureau of Dental Health Education. The book has more than 50 illustrations which give the patient a clearer understanding of major dental diseases and of the measures needed to restore and maintain dental health.

Illustrations include a picture diagram of a healthy tooth and its supporting tissues, how decay begins, periodontal problems, malocclusion, typical restorations and preventive procedures in the dental office.

The book is plastic-coated, 8½ by 11 inches, and has 16 pages. Copies may be obtained for $1 each from the Order Department, American Dental Association, 222 E. Superior St., Chicago 11.

DENTAL EDUCATION COUNCIL REAFFIRMS SPECIALTY STAND

At its meeting September 6-8 in Chicago, the Council on Dental Education reaffirmed its position in regard to specialty practice as embodied in the Council resolution to be transmitted to the House of Delegates. The resolution reads: "Resolved, that after January 1, 1965, all members of the Association subsequently desiring to announce themselves as specialists or as limiting practice in one of the areas approved by the American Dental Association be required to complete two or more years of advanced education as specified by the certifying boards, essentially all of which must be in or directly related to the selected area, or to possess a state license permitting an-



"The Chairside Instructor," a new patient education aid, is now available to dentists. Shown above is one of the double-page spreads in the book. On the left-hand page is an explanation of the uses of the roentgenological examination and on the right-hand page is an explanation of the various types of restorations. The 16-page book is available from the American Dental Association.

nouncement in an area approved by the American Dental Association."

In other actions, the Council approved a statement of policy regarding experimentation in the training and utilization of dental hygienists and dental assistants. This statement, which will be submitted to the House of Delegates at the Philadelphia annual session, embodies views and recommendations of the participants in a conference on auxiliary personnel functions. It includes a description of the professional responsibilities of the dentist, enumeration of principles governing experimentation, and lists some major areas in which experimental programs in effective utilization of dental hygienists and assistants may be initiated.

ARRANGEMENTS COMMITTEE APPOINTED FOR MIAMI BEACH

The Board of Trustees has approved the list of personnel for the General Committee on Local Arrangements for the 1962 annual session in Miami Beach, Fla., as submitted by Alvin D. Farver, general chairman.

Those appointed were: vice-chairman, Arthur W. Kellner, Hollywood; secretary, James W. Cosper, Jr., Coral Gables; and honorary officers: Marvin E. Baxla, Fort Lauderdale; Delio M. Cobo, Key West; Ruben P. Groom, Jacksonville; Frederick E. Hasty, Jr., Coral Gables; Leslie L. Lund, Miami; Kenneth E. Montgomery, West Palm Beach, and Samuel H. Zalmanoff, Miami Beach.

Committee on reception: Richard C. McDavid, Jr., chairman, Miami Beach; Meyer Eggnatz, vice-chairman, Miami Beach; Ray H. Anderson, Hollywood; Jack H. Beckwith, Jr., Miami; Henry J. Biosca, Miami; Walter H. Campbell, Miami Beach; William R. Edwards, Fort Lauderdale; Froilan H. Gato, Miami Beach; Elbert C. Geiger, Miami; Irving Gordon, Miami Beach; Curtis A. Haggard, Coral Gables; Gerald E. Halker, Homestead; Richard L. Mathewson, Miami Beach; Jose E. Munoz, Miami; Thomas A. Price, Miami, and Samuel H. Zalmanoff, Miami Beach.

Committee on information services: George J. Coleman, chairman, Coral Gables; Leonard S. Turner, vice-chairman, Miami; James R. Butler, Homestead; Fred W. Crockett, Jr., Miami Beach; Frances B. Glenn, South Miami; Edward N. Green, Coral Gables; Jerry G. Hagen, Miami Beach; Gerald E. Halker, Homestead; Victor Lenchner, Miami Beach; Richard L. Mathewson, Miami Beach; J. Pickett Miles, Miami Beach, and Bernard E. Smyers, Coral Gables.

Committee on social functions: H. Roger Turner, chairman, Miami; Charles L. Craig, vice-chairman, Coral Gables; William W. Ashley, Miami; Richard C. Brown, Fort Lauderdale; Bruce W. Highly, South Miami; Olin G. McKenzie, Miami; A. Durwood Simpson, Jr., Miami; H. Willett Stubbs, Miami, and Leonard S. Turner, Miami.

Committee on women's activities: Mrs. George J. Coleman, chairman, Coral Gables; Mrs. William H. Fountain, vice-chairman, Miami; Mrs. Jack H. Beckwith, Miami; Mrs. James W. Cosper, Jr., Coral Gables; Mrs. William W. Dolan, Coral Gables; Mrs. Joseph A. DuPree, Miami; Mrs. Edward N. Green, Coral Gables; Mrs. Charles D. Hall, Coral Gables; Mrs. Frederick E. Hasty, Jr., Coral Gables; Mrs. Bailey D. Hinton, Jr., Coral Gables; Mrs. Louis F. Jourdain, Coral Gables; Mrs. Jerome N. Matthews, Miami; Mrs. Jose E. Munoz, Miami; Mrs. Edward V. Petrow, Coral Gables; Mrs. William A. Shoemaker, Jr., Coral Gables; Mrs. Richard T. Simpson, Jr., Coral Gables; Mrs. H. Willett Stubbs, Miami, and Mrs. Raymond S. Sullivan, Kendall.

Committee on publicity: Ernest B. Penn, chairman, Miami; Willard Van Camp, vice-chairman, Miami Beach; Leslie B. Bell, West Palm Beach; William F. Briggle, Coral Gables; Meyer Eggnatz, Miami Beach; Charles W. Forum, Jr., Fort Lauderdale; Edwin C. Lunsford, Miami; Thomas A. Price, Miami, and H. Elton Woodward, Tampa.

Committee on clinics and motion pictures: Robert L. Kaplan, chairman, Miami; Jesus E. Carmona, vice-chairman, Miami; George Balber, Miami; Richard C. Brown, Fort Lauderdale; Dwight J. Castleberry, Homestead; James W. Cosper, Jr., Coral Gables; Irving Gordon, Miami Beach; Frederick E. Hasty, Jr., Coral Gables; Thomas C. Jones, Coral Gables; Franklin M. Kenward, Coconut Grove, Miami; Jack Landsberg, Miami; Robert Litowitz, Miami Beach; Richard L. Mathewson, Miami Beach; William M. Schiff, Miami; David J. Seitlin, Miami; Jack Seitlin, Miami; William A. Shoemaker, Jr., Coral Gables; Donald G. Smith, South Miami; Richard Starr, Coral Gables; Stanley Sutnick, Miami Beach; Max I. Tendrich, Miami, and Edward C. Thibodeau, Fort Lauderdale.

CHRISTMAS GIFT CALENDARS AVAILABLE FROM ASSOCIATION

The Association's Christmas greeting-dental health education-appointment calendars are again available to be sent to patients. The calendars include brief dental health messages and space for dental and other appointments. They are 5½ by 8½ inches when closed and illustrated in full color. Human interest situations, including dental office scenes, are depicted in the illustrations. If desired, the dentist's name may be imprinted on the cover for a slight additional charge.

The calendars may be ordered from the Bureau of Dental Health Education at the Central Office, 222 E. Superior St., Chicago 11. They cost $18 per hundred, plus imprinting.

DENTISTS REMINDED PLANES TO BE GROUNDED OCTOBER 14

The Association Housing Bureau has reminded dentists planning to attend the annual session in Philadelphia that all commercial and nonmilitary plane flights will be grounded October 14. As the session convenes October 16, the Bureau recommends that allowances in travel plans be made for this development. Travelers should check with their airlines to ascertain whether their flights will be affected. The ban, a result of an air defense test, will be in effect from noon to midnight, Eastern standard time.

The Bureau also suggests that anyone having a change in his arrival time in Philadelphia should check with the hotel from which he received his room confirmation and make any necessary change directly with that hotel.

LOU JOSEPH, ASSISTANT HEAD, INFORMATION BUREAU

Mr. Lou Joseph, former assistant state editor, Atlantic City, N. J., *Press*, has been appointed an assistant director of the Bureau of Public Information. A veteran of 16 years of reporting experience, Mr. Joseph is a native of Berlin, Germany. From 1945 to 1951, he was a staff writer for the German language daily, *Die Neue Zeitung*, published in Munich by the U.S. High Commission for Germany.

While with the Atlantic City newspaper, he was also publicity director in southern New Jersey for the American Cancer Society, the National Foundation and the Retarded Children's Association.

Mr. Joseph is a member of the Atlantic City, N. J., Press Club and a former member of the West German Writers and Authors Guild.

Legislation

SENATE, HOUSE PASS RECORD AMOUNT FOR DENTAL HEALTH

The Senate and the House of Representatives September 12 passed a record amount, $19,840,000, for dental health activities in fiscal 1962. Of this total, $17,300,000 will go to the National Institute of Dental Research and the remainder will be for the Public Health Service's division of dental public health and resources. The figure is 28 per cent higher than the amount made available during the present fiscal year.

WISCONSIN AUTHORIZED TO START DENTAL HEALTH PLAN

The Wisconsin State Dental Society has been authorized by the Wisconsin state legislature to establish a nonprofit dental health plan. The bill, signed into law August 17 by Governor Gaylord Nelson, gives the dental society three alternatives in establishing its insurance plan. The society can create and operate its own plan, accept one established by an insurance organization, or organize a corporation to operate the service.

Patients covered under the plan will

have free choice of any dentist licensed to practice in Wisconsin who has agreed to abide by the terms of such a plan. No dentist may be required to participate exclusively in the plan.

National Defense

NEW NAVY TRAINING FILM, 'ORAL HYGIENE,' PREMIERED

A new Navy training film, "Oral Hygiene," was given its premier, August 22, at the National Naval Medical Center, Bethesda, Md. The film was produced as part of the Naval Dental Corps' preventive dentistry program. It is intended to illustrate the proper methods of oral hygiene, to provide motivation for personal oral care, and to offer information on additional aspects of preventive dentistry. Technical advisors for the film were Mr. Charles A. Greene, Jr., Capt. Herbert J. Towle, Jr. (DC), USN, and Cmdr. Perry C. Alexander (DC), USN.

POSSIBLE DENTIST DRAFT TO MEET DEFENSE BUILD UP

One hundred and sixty dentists may be ordered for induction to meet the expanded requirements of the Armed Forces for dental officers. Frank B. Berry, assistant secretary of defense (Health and Medical), in a letter to Harold Hillenbrand, secretary of the American Dental Association, has advised that the Department of Defense soon may have to ask the Selective Service System to order the increase in inductions.

This number would be in addition to the 1961 dental graduates scheduled to go on active duty through the Armed Forces Reserve Dental Officer Commissioning Program and in addition to the Ready Reserve and National Guard dental officers being ordered to active duty with their units. All of the 160 dentists will be assigned to serve with the Army Dental Corps.

Dr. Berry suggested that militarily obligated dentists volunteer for military service since "each one volunteering would, of course, reduce the requirement of 160 by one dentist."

A dentist draft has not been necessary since 1955 because of the success of the voluntary recruiting programs. If such a draft now became necessary, the priority schedule would be based on age. Eligible registrants under age 26 would be called first, then those between 26 and 35, who had been deferred while in college or dental school, with the youngest called first.

ARMY'S FIRST WOMAN DENTIST STARTS INTERN TRAINING

Lt. Alba F. Zanin (DC), the Army's first woman dental intern, is now in training at Walter Reed Army Medical Center. She will be obliged to serve a minimum of two years on active duty as a commissioned officer in the Army Dental Corps, when she completes her internship next June. Lt. Zanin received her D.D.S. degree from Columbia University Dental School.

CIVIL DEFENSE CONFERENCE SET FOR PHILADELPHIA

The Third National Dental Civil Defense Conference will be held at the Sheraton Hotel, October 14, in Philadelphia, preceding the American Dental Association's annual session. All Association members and members of allied health organizations are invited to attend.

The conference is sponsored by the Association and presented under the auspices of the Council on Federal Dental Services. Included on the program will be Robert Strausz-Hupé, director of the Foreign Policy Research Institute at the University of Pennsylvania; Col. Thomas A. McFall, director of the division of dentistry at the Walter Reed Army Institute of Research, and Mr. Jerrold M. Michael, assistant chief of the division of

health mobilization of the U.S. Public Health Service.

John R. Abel, president-elect of the Association, will welcome the participants and the program will be moderated by Thomas F. Powers, chairman of the Council on Federal Dental Services.

Reserve dental officers of the Army and Air Force dental services may earn retirement point credit by attending the conference and registering with the military chairman.

Public Health

ARKANSAS DENTAL DIVISION RAISED TO BUREAU STATUS

The Division of Dental Health of the Arkansas State Board of Health has been raised to the status of Bureau of Dental Health. The dental director will now report directly to the top echelon of the State Board of Health—the assistant state health officer and the state health officer. William R. Alstadt, former president of the American Dental Association, is continuing as a member of the State Board of Health.

SURVEY FOR CHECKING SAFETY OF DENTAL X-RAY MACHINES

Dental x-ray machines are being checked for safety in a nation-wide survey by the U.S. Public Health Service. The mail-order method of checking is called the Dental Surpak procedure. Although the procedure is useful primarily to assess factors which affect radiation exposures of dental patients, it may provide a clue to the occupational doses of the dentist and his assistant.

The procedure is designed to check the size of the beam at the end of the pointer cone, the approximate roentgen output in mr/mas, total filtration (inherent and added), beam symmetry, and leakage radiation from the tube which points in the direction of a patient's face.

Dentists may request Surpaks from their local or state health departments. After the dentist has exposed the Surpak as instructed, he returns it to the health department which, in turn, sends it to the public health service's radiological health laboratory in Rockville, Md., for controlled processing and interpretation. The results are sent back to the local health department which notifies the participating dentist as to whether or not his machine requires corrective procedures to meet his state's recommended standards. In most cases, the state health agencies will supply, without cost, the proper collimators and aluminum filters needed for corrections.

Dental Education

CASUALTY TREATMENT COURSE TO BE HELD AT GREAT LAKES

Two spaces have been set aside by the Navy for attendance by civilian dentists at a Casualty Treatment Training Course to be held at the U.S. Naval Training Center, Great Lakes, Ill., November 6-10. Association members interested in attending should contact the Council on Federal Dental Services at the Central Office.

ROENTGENOLOGY COURSE TO BE HELD NOVEMBER IN MARYLAND

The U.S. Public Health Service will hold a one-week training course on medical roentgen-ray protection, November 6-10, at the Radiological Health Laboratory, Rockville, Md. The course will provide instruction in the principles of protection to both patient and operator and in x-ray inspection procedures. A prerequisite to the course is basic radiological health, a course given at Cincinnati, October 9-20. A related course in occupational radiation protection is scheduled for October 23-November 3.

Information may be obtained from the

Chief, Training Program, Robert A. Taft Sanitary Engineering Center, 4676 Columbia Parkway, Cincinnati 26, Ohio.

POSTGRADUATE COURSES DEAL WITH VARIED SUBJECT MATTER

Albert Einstein • The Albert Einstein College of Medicine of Yeshiva University has announced the following postgraduate courses; Endodontics, November 29, Julius Fox, $30; diagnostic oral pathology for oral surgeons, October 26-27, Ernest Baden and Surindar Bhaskar, $60; periodontics, October 30-November 3, Irving Yudkoff, Marvin N. Okun and associates, $175; pharmacology, January 25-26, 1962, Stanley R. Spiro and associates, $60; clinical photography, November 16-17, Eugene B. Blanck, $50, and prosthetics, November 30-December 1, Lester E. Rosenthal, Max A. Pleasure, Stanley L. Lane and Milton Ivker, $100. Further information and application blanks may be obtained from the director of postgraduate dental program at the school, Eastchester Rd. and Morris Park Ave., Bronx 61, N.Y.

California • The University of California School of Dentistry is offering the following postgraduate courses: Recent advances in periodontal therapy, October 6-7, Saul Schluger; the kile complete denture technic, November 3-4, K. Paul Ramsay; patient home care in the control of periodontal disease, November 10, Josse E. DeWever and Perry A. Ratcliff; and modern endodontic therapy, November 17-18, John I. Ingle. Further information may be obtained from Miss Marilyn J. Johnson, administrative assistant of postgraduate education at the school, San Francisco Medical Center, San Francisco 22.

Detroit • The Detroit District Dental Society will present a course in periodontal therapy, September 30-October 1, by D. Walter Cohen. Further information may be obtained from the society at 4421 Woodward Ave., Detroit 1.

Doctors' Hospital • A one-year senior internship in oral surgery, approved by the Council on Dental Education of the Canadian Dental Association, and affiliated with the graduate oral surgery training program of the Faculty of Dentistry, University of Toronto, is available at the Doctors' Hospital, Toronto, Canada. The position carries a stipend of $300 per month. Further information may be obtained from the administrator of the hospital, 45 Brunswick Ave., Toronto, Canada.

Emory • The Emory University School of Dentistry has announced several courses it will offer: Philosophy of a successful dental practice, November 13-14, Robert O. Jones; oral surgery, December 6-8, H. J. Harpole; periodontics, January 15-19, the department of periodontics; treatment planning and designing of partial dentures, February 22-23, Lynn C. Dirksen; and pulpal reactions to operative procedures and to various filling materials, caries and caries control in children and adults, March 2-3, Maury Massler. Further information may be obtained from the school, Atlanta 22.

Illinois • The University of Illinois College of Dentistry, division of postgraduate education is offering a course in disease of the oral mucosa, November 22. The visiting professor will be Jens J. Pindborg, doctor of odontology of the Royal Dental College, Copenhagen, Denmark and the fee is $25. Further information may be obtained from the division of postgraduate education at the school, 808 S. Wood St., Chicago 12.

Indiana • Indiana University School of Dentistry is offering the following refresher courses: Crown and bridge prosthodontics, January 15-18; oral surgery for the general practitioner, February 9, 16 and 23; symposium for dental technicians, February 14; periodontics postgraduate course, February 28, March 7, 14, 21, 28, April 4, John F. Pritchard; and porcelain jacket crowns and veneers, March 7-9. Further information may be obtained from the dean of the school, 1121 W. Michigan St., Indianapolis 2.

Kansas • The University of Kansas City School of Dentistry is now accepting applications for graduate study in oral surgery, orthodontics, pedodontics, periodontology, prosthodontics and basic sciences for the class beginning July 1, 1962. All programs may be expanded to include the master of science degree. A limited number of National Institutes of Health teacher-researcher fellowships are available. Further information may be obtained from the director of graduate studies at the school, 1108 E. Tenth St., Kansas City 6, Mo.

Massachusetts Memorial Hospitals • The Massachusetts Memorial Hospitals have announced the following courses for 1962: Periodontal pathology, January 22-26, Henry M. Goldman, Jack Bloom, $200; the use of ultrasonics in periodontal therapy, March 17, Henry M. Goldman, $35; periodontal therapy, March 19-23, Henry M. Goldman, Bernard S.

Chaikin, Gerald M. Kramer, William Pendergast, Jack Bloom and associates, $200; and advanced course in periodontal therapy, March 26-30, Henry M. Goldman, Bernard S. Chaikin, Gerald M. Kramer, William Pendergast and associates, $200. Further information may be obtained from David J. Baraban, director of postgraduate studies, department of stomatology at the hospitals, 750 Harrison Ave., Boston 18.

Ohio • The Ohio State University College of Dentistry will offer several short courses in the coming academic year. They are: Complete denture prosthodontics, October 2-6 and February 26-March 2, Carl O. Boucher; general anesthesia in dentistry, November 13-17 and April 23-27, Morgan L. Allison; oral surgery, November 27-29 and May 7-9, Morgan L. Allison; hospital management for dental procedures, January 22-24, Morgan L. Allison and Bernard S. Snyder; clinical management of gum diseases, January 25-27, Associate Dean Wilson and William V. Walton; a refresher course in dental hygiene, January 29-30, Consuelo Wise and Dr. Wilson; crown and bridgework, January 31-February 2, Thomas F. McBride and A. Curtis Long; children's dentistry, February 5-9, Lyle Smith Pettit and Benjamin H. Williams; removable partial dentures, March 5-9, Victor L. Steffel.

Southern California • The University of Southern California School of Dentistry offers two courses: Oral rehabilitation, November 17-19, Charles E. Stuart, $105; and occlusion —functional development in wax, October 13-15, Everitt V. Payne, $95. Further information may be obtained from the division of postgraduate instruction at the school, University Park, Los Angeles 7.

Tennessee • The University of Tennessee College of Dentistry is offering several courses in the coming academic year. They are: Periodontology, November 8-10; operative dentistry, November 15-17; full denture prosthesis, November 29-30; hospital dentistry, February 5-7; role of the dentist in the management of oral cancer, February 7-9; dental therapeutics, February 21-24; endodontia, February 28-March 2; dental hygiene, April 4-6; fixed partial prosthodontics, April 9-11; evaluation—clinical materials, April 18, and surgical endodontia, June 13-15. Further information may be obtained from the postgraduate department of the University of Tennessee Medical Units, 847 Monroe Ave., Memphis, Tenn.

Texas • The University of Texas Postgraduate School of Dentistry has announced a course in oral roentgenology to be given October 23-25. Visiting lecturer will be Sydney Blackman of London. The tuition is $75. Further information may be obtained from Sumter S. Arnim, director of the school, P.O.B. 20068, Houston 25.

Washington • The graduate division of the University of Washington School of Dentistry is offering a graduate course in periodontics leading to a master's degree in dentistry. The training period is two calendar years, beginning September, 1962. Applications must be in by December 1, 1961, to be considered. The trainee will receive a stipend of $5,000 a year. His tuition and some additional expenses will be paid as well as allowances for travel to scientific meetings. Further information may be obtained from Saul Schluger, director of graduate dental education at the school, Seattle 5.

Research

LYMAN, ASSISTANT DIRECTOR, DENTAL RESEARCH INSTITUTE

F. Earle Lyman has been appointed to the newly created position of assistant director of the National Institute of Dental Research. He is succeeded as chief of the extramural programs branch by Robert C. Likins of the institute's laboratory of biochemistry.

F. Earle Lyman

Dr. Lyman received his Ph.D. degree in 1940 from the University of Michigan. He has been an assistant professor of zoology at Grand Rapids Junior College, aquatic biologist with the Tennessee Valley Authority, assistant chief of the entomology branch of the Communicable

Disease Center of the Public Health Service, and associate professor of zoology at Southern Illinois University. In 1955 he joined the National Institutes of Health as executive secretary of the morphology and genetics study section and was made chief of the extramural programs branch in 1956.

Robert C. Likins

Dr. Likins received his D.D.S. degree from Kansas City University in 1945 and was a Carnegie Fellow in dental research at the University of Rochester School of Medicine and Dentistry before joining the National Institutes of Health in 1946. At that time he was an investigator with the then dental research section, division of physiology, Experimental Biology and Medicine Institute. He was assigned to the new dental institute on its establishment in 1948. He is president of the Washington, D.C., section of the International Association for Dental Research.

HARRY LYONS TO HEAD ORAL DISEASE RESEARCH COMMITTEE

Harry Lyons, dean of the Medical College of Virginia School of Dentistry, has been appointed chairman of the newly established Research Program Committee in Oral Diseases of the Veterans Administration. The committee will serve as resource personnel to the VA's director of research, keeping him informed of the Veterans Administration's research activities in oral diseases and assisting in planning and developing the VA research program in this field.

Committee members are Herbert K. Cooper, director of the Lancaster Cleft Palate Clinic; Francis A. Arnold, Jr., director of the National Institute of Dental Research; Philip Person, chief of the special dental research laboratory, Brooklyn, N. Y., VA Hospital, and George W. Greene, Jr., of the VA Central Office in Washington, D.C. Coordinator for the committee is William M. Goodwin, director of dental professional service for the VA.

General

FLUORIDATION RULED SAFE, EFFECTIVE IN CHICAGO

Fluoridation of public water supplies was declared a safe and effective method of reducing tooth decay, August 31, by Chicago's Superior Court master in chancery Mayer Goldberg. After a five-year legal battle, Mr. Goldberg recommended the dismissal of an injunction suit filed against the City of Chicago by four anti-fluoridationists.

The plaintiffs who filed the suit shortly after Chicago began fluoridating its south side water supply May 1, 1956, said introduction of fluorine into the water supply violated the due process of law and freedom of religion provisions of the Constitution.

In his ruling, Mr. Goldberg said the evidence presented indicated that "fluoridation . . . will necessarily result in a substantial reduction in tooth decay among children" and that fluoridation "will not in any manner whatsoever cause physical harm of any kind to any person." His report also states that an addition of one part fluoride per one million parts of water does not cause disfiguring, mottled enamel in the teeth of children or of anyone else.

On the religious point, Mr. Goldberg ruled that fluoridation is not a medication, but is analogous to eating a well-

balanced diet that includes vitamins and calcium. He said fluoridation merely adds a mineral that is natural to many United States watersheds, including Lake Michigan (the source of Chicago's water supply). Therefore, he declared, no religious scruples against taking medication are violated.

In reply to the anti-fluoridationists' arguments that fluoridation is "oppressive and discriminatory" because it supposedly benefits only children who are under 16 years old, Mr. Goldberg observed that these youngsters eventually will comprise the adult population and that any measure that helps the health of today's children benefits all of the population tomorrow.

Among those testifying at the 51 hearings the master held were H. Trendley Dean, former director of the National Institute of Dental Research; J. R. Blayney, professor emeritus of dentistry at the University of Illinois, and J. Roy Doty, assistant secretary of the American Dental Association in charge of research and therapeutics.

Mr. Goldberg's 64 page report was sent to the Superior Court where it will be assigned a ruling. The court is not bound by his report, but judges usually follow master's recommendations.

LESTER R. CAHN RECEIVES HONORARY DEGREE FROM LEEDS

Lester R. Cahn, professor of oral pathology, Columbia University, received an honorary Doctor of Science degree, June 21, from the University of Leeds in England. The degree was conferred by the chancellor of the university, Her Royal Highness, the Princess Royal, in recognition of Dr. Cahn's work in dental education and his reputation as a world-wide authority on oral pathology.

CLAUDE S. WILLIAMS DIES IN NEW ORLEANS, AUGUST 9

Claude Somers Williams, Jr., 58, former president of the Mississippi Dental Association, died August 9 in New Orleans. Dr. Williams also had served as president of the Forrest County Dental Society, and the East District Dental Society. He was a Fellow of the American College of Dentists, and a member of the Southern Academy of Periodontology, the Pierre

Lester R. Cahn (l.), professor of oral pathology, Columbia University, receives an honorary Doctor of Science degree from the University of Leeds in England. Pictured with Dr. Cahn are, from the left, Sir Charles Morris, vice-chancellor of the university; Miss Sue Khozai, senior vice-president of the union, and the Princess Royal, chancellor of the university.

Fauchard Academy, the American Association for the Advancement of Science, Fédération Dentaire International and the International Academy of Dentistry. He had been a delegate to the American Dental Association's House of Delegates since 1952. He received his D.D.S. degree from Tulane University in 1928.

Dr. Williams is survived by his wife, two children, three grandchildren, and four sisters.

ISAAC SCHOUR RECEIVES NEW YORK'S SPENADEL AWARD

Isaac Schour, dean of the University of Illinois College of Dentistry, received the Henry Spenadel Award for 1961 of the First District Dental Society of New York. The annual award is given to the most deserving individual or organization having made outstanding contributions to the advancement of dentistry or the dental profession.

Dr. Schour will be presented with an illuminated scroll and gold medal, October 9, at the Hotel Statler Hilton in New York. He is a Fellow of the American College of Dentists and of the American Public Health Association. In 1941 he was president of the International Association for Dental Research. He has been a member of the editorial board of the *Journal of Dental Research* and chairman of the committee on dentistry of the Society for Research in Child Development. In 1956 he received the research award of the Association of Dental Alumni of Columbia University.

NOVEMBER 'TODAY'S HEALTH' FEATURES DENTAL HEALTH

The November issue of *Today's Health* magazine will be devoted largely to dental affairs. Charles H. Patton, president of the American Dental Association, has written a guest editorial on fluoridation for the publication and there is also a lengthy article on dental caries by a free-lance writer.

The cover of the magazine contains a portrait of Pierre Fauchard, father of modern dentistry. The original portrait from which the cover was made has been presented to the American Dental Association by the editor of the magazine, Kenneth N. Anderson.

PRISON DENTAL SERVICE IN CHILE ASKS FOR EQUIPMENT

The dental service of the public prison in Valdivia, Chile, has asked for the donation of dental equipment to replace that lost in the earthquake which hit southern Chile last year. The service has no support of any kind and its dentists give their services free. The services they render in this establishment are related exclusively to extractions and the equipment needed includes a sterilizer, ampule syringes, forceps, elevators, chisels, bone files, surgical scissors, needle holders and suturing material.

Contributions or correspondence may be sent to Cárcel Pública, Servicio Dental, Valdivia, Chile.

Also • The Latin American Association of Dental Schools will sponsor a Dental Education Congress jointly with the WHO seminar on dental education in Bogota, Colombia, October 15-22. . . . The Toledo Board of Education voted to stop the sale of chocolate milk in the elementary schools on the grounds it contributes to tooth decay, thus ending a year-long effort of the Toledo Dental Society. . . . R. Glenn Reed, Jr., president of the Northwest District Dental Society of Georgia, was re-elected to a two-year term as trustee of Kiwanis International. . . . Six major communities of Idaho now have portable dental equipment which is available to all local dentists for treating patients unable to go to a dental office. . . . Dentists interested in testing the new record and accounting system for dental offices that is being studied by the Council on Dental Health of the American Dental Association may write for information to the Council at the Central Office in Chicago.

international dentistry

News from Great Britain

British Dental Association • In the presidential address of Mr. Percy Cocker to the annual meeting of the British Dental Association the following passages occur:

"A world survey of the educational standards required by various countries . . . to practice dentistry, published in 1957, showed that there were 246 dental schools spread over 56 countries, and it is understandable that the U.S.A. leads with 46, but what is surprising is that Italy is second with 21, Germany, Great Britain, and Russia following with 17, 16, and 14 respectively. All countries require a prescribed standard in general education and training varies from three to seven years with five years as the more usual. In Austria, Italy, and Spain a medical qualification is required before proceeding to dentistry.

"The National Health Service Acts play a big part in the practice of dentistry in this country but service under them leaves something to be desired. The best that can be said of the system of remuneration is that there is no agreement on an alternative. The present method requires a measure of interference with clinical freedom which often results in limitation of treatment and thereby produces a feeling of frustration in the practitioner. Experience and patient negotiations have produced a workable scheme and it is to be hoped that further modification will be agreed as the patterns of practice are more clearly understood and as circumstance dictates. Unless this proves to be the case I can see no worthwhile future for the dental services.

"One feature of the National Health Service which requires urgent attention is the widening of the scope of dental treatment. I refer to the greater use of crowns, bridges, skeleton plates, gold and porcelain inlays; the treatment of periodontal diseases other than by extractions; and the practice of oral medicine. This might need the introduction of some measure of grant-in-aid, but out-of-date doctrinaire concepts should not be allowed to stand in the way.

"The Report of the Royal Commission having been accepted by the profession and the government, the Dental Rates Study Group has been established. It is to be hoped that their decisions will do nothing to hamper the trend of dentistry towards scientific development and the clinical and technological application of it to which I have referred.

"Unfortunately, the recommendation of the McNair Committee that the government should foster dental health education, though accepted by the government, has been allowed to become another example of a pious hope warmly applauded by politicians, proudly exhibited as showing progressive thought, and quietly suffocated by inaction and lack of imagination.

"That any government should sponsor a health service and not take over and support financially health education is an abnegation of public duty which is disgraceful.

"We should remember that the methods and materials we use today have resulted from scientific investigation in the past, and our outlook to scientific investigation today will determine the extent of our advance tomorrow. If we have this in mind and idealism as our guiding motive, the evolution of dentistry will proceed apace and, for my part, I see no limit to our progress in the future."

Industrial Practice • A special sub-committee, appointed in August, 1958 "to advise the Council on terms and conditions in industrial dental practice and to make recommendations," has made the following report:

"It is evident that the provision of dental services through the medium of industrial clinics is increasing, and we see much that is good in this trend. Industrial practice brings dental treatment to many who might not otherwise seek it; it provides opportunity for the dissemination of advice and propaganda on oral

health; and it makes for the maximum saving of the time of both dentist and patient and for the economical use of scarce dental manpower.

"Although a few organisations run their own independent schemes, it is clear from our enquiries that, broadly speaking, industrial practice is but a subdivision of general dental practice under the Health Service. It does, however, present certain special ethical and quasi-ethical problems which center mainly on the possibility that the industrial clinic might compete unfairly with the more conventional type of general dental practice. It can, of course, be argued that this aspect of the matter assumes less importance when viewed against the present general shortage of dentists with its corollary that the need for treatment is more than can be met by dentists now in practice. But we are endeavouring to look beyond the immediate future and to offer some comment which will be valid and useful when more normal conditions supervene. Moreover, the distribution of dentists is such that, notwithstanding the over-all shortage, the setting up of an industrial dental clinic can have considerable impact on established practices in the immediate locality. It is accordingly specially important that all concerned with industrial dental schemes should take the greatest care that they are invulnerable to criticism from the ethical aspect."

Conclusions and summary of recommendations from the Sub-committee's report are as follows:

1. Industrial dental services, properly run, are a social asset, and, subject to the comments which follow, should not be discouraged.

2. Professional appointments in industrial dental clinics should be advertised to the profession.

3. The ideal industrial dental scheme is one in which employees are regularly examined and advised to consult their own dentists for any treatment found to be necessary.

4. Eligibility for the service should not extend beyond employees.

5. Employees should be free to consult the dentist of their own choice and should not be coerced or "directed" towards the company dentist.

6. The firm must not pay the patients' N.H.S. statutory contribution towards the cost of dental treatment on condition that they consult the company dentist.

7. The ideal system of remuneration in industrial dental practice is by way of salary, independent of the Health Service. We recognise, however, that the system most generally practised is that in which the scheme is partly financed through the Health Service.

8. In the case of schemes based on the Health Service, the following considerations apply:

a. Where the dentist receives a salary, it is illegal for the firm to make a financial profit from the scheme;

b. Where the practitioner collects his fees direct from the Executive Council, he should pay the firm on a fair economic basis for the facilities provided by them.

9. The practitioner should be responsible directly to the management and not to the company's medical officer.

Apples and Dental Health • A most interesting report by Geoffrey Slack and W. J. Martin, on a follow-up examination connected with apples and dental health, published in the May *British Dental Journal*, contains the following points:

"The report of a two-year investigation designed to test the value of apples in controlling dental disease has been published (Slack and Martin, 1958). In the study, a number of children were divided into two groups, one of which received a daily supply of apples issued as slices after eating each meal and after eating anything between meals.

"The results of the dental examinations carried out every six months during the period of the investigation were encouraging. Comparison of the experience of dental caries showed that the children receiving apples had less caries than those in the control group, although in some age groups the differences did not reach statistical significance because of the small numbers. At the end of the first six months the group receiving apples had much less gum disease than the control group and they retained their advantage throughout the study.

"Eighteen months after the end of the investigation a further follow-up dental examination was carried out on the children who remained in the home, to determine whether any differences still existed between the apple and control group.

"The results of the follow-up study were of interest and stimulated further enquiry. During the two-year period of the investigation a more than adequate supply of selected apples was delivered regularly to each of the family homes in the apple group. This supply which was free of charge ceased in December 1957 upon completion of the fifth examination—the last of the six-monthly series. Enquiry revealed that at this time the habit of issuing apple slices to the children after eating was broken completely. In fact no family had made any adjustment to its budget to include the regular purchase and issue of apples on the previous scale. The main reasons seem fairly clear;

they include the comparatively high cost of apples, the difficulty of obtaining the right types, and the understandable relaxation of discipline which had been sustained over a period of two years.

"Within the limits imposed by the small number of children remaining it seemed reasonable to assume that the discontinuation of the use of apples had resulted in the deterioration of the dental health of the apple group children.

The British Dental Guild • The British Dental Guild is to contribute towards the expenses of the profession's representatives on the Dental Rates Study Group which will work out a scale of fees following the acceptance of the Pilkington Report.

It was understood that the primary object of the Guild was to protect the interests of the profession in the Health Service and that the trust deed gave the managers wide powers to employ the funds to this end. A contribution for the purpose now suggested would help materially in ensuring that the profession's interests were fully protected in the deliberations which would lead to the production of the new scale of fees.

Royal College of Surgeons of England • Sir Wilfred Fish has been elected a Fellow of the College, the highest honour that general surgery can show to a dental surgeon.

G. H. Leatherman, D.M.D., F.D.S., R.C.S., F.A.C.D.

News from Argentina

Fifth Mid-Argentine Dental Meeting • The Dental Association of Argentina and the Dental Association of San Juan held a joint meeting, May 22-25. There were 25 participants from Buenos Aires, two from Mendoza, three from Córdoba and one from Rosario de Santa Fé. Chile was represented by three colleagues. In addition to the usual scientific subjects, there was some discussion of public health and a panel presentation on socioeconomic problems.

Socioeconomic Congress • The Dental Confederation of Argentina, which includes 28 associations and represents the majority of the 10,000 dentists of the country, held its first Congress, August 13-17. The following subjects were discussed: professional assistance, dentistry and health insurance services, dentistry and the laboratory, public opinion of dentistry, planning for professionals, and fluoridation of water supplies. A. A. Macchi presided. J. M. Lueje was the chairman of the Committee on Organization.

New School • A new college of dentistry in the city of La Plata, capital of the Province of Buenos Aires, is planned. A five-year course of study includes dental health and the study of languages. The professors will work six hours daily, six days a week.

School Dental Health Meeting • The Dental Association of the National School of Dental Service held its first meeting on this specialty, July 10-13. Subjects discussed were: general anesthesia for children, nutrition and caries, orthodontics and dental health. J. A. Gil Herrera, chairman of the Committee on Organization, presided.

Opening of the 1961 Course in the College of Dentistry of Buenos Aires • On June 11, the president of the University of Buenos Aires presided at the opening session of the current year. Professor Dr. P. Saizar was in charge of the farewell to the graduates of 1960 and the reception of new students. He discussed the influence of books, of professional association, of colleges and dental schools on the progress of dental science, and in the course of his speech said: "Many circumstances have restricted scientific research in our college for many years. . . . [However,] I can point out with satisfaction that once more we are beginning to achieve pure research in all departments. This, to me, is one of the most auspicious indications for the future of our college. . . . Among the extraordinary [achievements] of our time . . . the dental profession has achieved outstanding [accomplishments]. . . . Research has proved that dental caries may be inhibited by the use of fluoride, either through adequate [topical application], by the addition to dentifrices, or, best of all, by the addition to drinking water. Results of the use of fluoride are . . . so valuable that it has given rise to a new branch of dentistry: public health dentistry which its supporters prefer to call 'social dentistry.' This aspect of the profession has become so important within a few years that at present public dental health is considered the fourth basic point in a dental career. . . . Dentistry . . . is demonstrating the value of mass attack showing that it is much more economical and less dangerous to prevent caries than to cure. In locations where such principles are applied, the incidence of dental caries has been reduced by half and at the cost of no more than a few centavos per capita.

"This emphasis of the profession has not escaped the progressive analysis of our university as evidenced by inclusion of a division

of dentistry recently created in the School of Public Health. I must point out [that] our college curriculum has not yet made equal progress. However, it is true that our plan of studies has not been actively pursued for many years and there is a need of revision. It does not seem advisable, however, to modify the dental course when the college has not yet been reintegrated in its autonomous rights within the university statute."

The meeting was closed by the acting dean, Zenon Lugones, who referred to the action taken to reestablish the college. He spoke of the requirements for return to normalcy and pointed out that the basic lack had been in overlooking the development of materials related to technics. He had obtained individuals capable of carrying out research and listed the first full-time professors, mentioning the well-known pharmacologist, E. Hug, who has been appointed for a two-year experimental program.

Juan Chaneles, D.D.S.

News from Brazil

New Officers • The first slate of officers of the newly named Brazilian Dental Association has been elected for the term 1961-1963. The new officers are: president, Alfredo Reis Viegas; vice-presidents, all the presidents of the 18 sections of the association (states, territories and federal districts); secretary general, Jairo Corrêa; secretary, Wladimir Pereira; treasurer general, Ernesto Piloto Gomes de Medeiros, and treasurer, Cyro Gomide.

Dental Public Health Supervisors • The supervisors of the Special Public Health Service Foundation met in the city of Ilhéus, state of Bahai, August 6-13. This service performs public health dentistry, mainly in the underdeveloped areas of Brazil, such as the regions of the basins of the Amazonas and São Francisco rivers, as well as the valley of the Dôce river. At the meeting, discussion topics included: Problems of public health education, selection of equipment, instruments and materials, planning of new programs, and training of auxiliary personnel used in the programs. In the past the dental service was guided, first by John Frankel, and later by Vernon Forney, both from the United States.

Trip Sponsored by WHO • Luiz Otávio Guimarães, assistant professor of technic and public health at the School of Public Health, University of São Paulo, is on a trip to Venezuela, Colômbia, El Salvador and México. For three months, Dr. Guimarães will study the organization of dental services in these countries under the auspices of the World Health Organization.

News from São Paulo • On August 17, prominent periodontists and other dentists met at the São Paulo Dental Association to establish rules regarding the production of toothbrushes. The conclusions will be sent to the manufacturers.

Pedro Planas, orthodontist from Spain, gave a three-day course on his specialty in August. He is the author of many articles that have been published in several countries, and his course aroused much interest.

On August 18, Sigurd P. Ramfjord, from the University of Michigan, spoke at the São Paulo Dental Association about his specialty, periodontics. Dr. Ramfjord then went to Londrina, state of Paraná, to address the International Convention of Periodontics, Operative Dentistry, and Prosthodontics.

Hans Freudenthal, C.D.

International News in General

INTERNATIONAL DENTAL CONGRESS TO HAVE EIGHT SECTIONS

The XIII International Dental Congress, which will meet July 7-14, 1962, in Cologne, Germany, will be divided into eight sections. These sections will be: the fiftieth annual session of the Fédération Dentaire Internationale (which includes in addition to meetings of the commissions and committees, two regular sessions of the General Assembly, one special session of the General Assembly on the subject of "Manpower" and three all-day meetings of the council), a five-day scientific program, an International Military Conference for dental officers who will have their own additional program, a scientific exhibition with the theme "150 years of dentistry," an exhibition of the dentist as an artist, social events, the ladies' program, and post-Congress tours.

Simultaneous translations of the Congress will be provided in English, French, Spanish, Italian and German.

Those attending the Congress must be enrolled. The enrollment fee for supporting members of the United States section of the Fédération Dentaire Internationale is $20.25. The enrollment fee for an associate member (wife, assistant, hygienist) is $12.65. All fees will increase after December 31, 1961. Enrollment forms, room reservation forms and checks to cover enrollment fees, should be sent as soon as possible to: International Dental Congress,

General Secretariat of the Congress, Universitätstrasse 73, Cologne, Germany. Those staying for the complete session will have room preference. These details will be taken care of for those traveling with a special group-tour.

Application forms for social events and excursions will be sent on enrollment. Tickets, badges, and programs will be supplied at the Congress. Any information relative to FDI dues or other subjects may be obtained from O. H. Moen, FDI national treasurer for the USA section, 6 Main St., Watertown, Wis.

Many participants will probably sail on the *S.S. Rotterdam* of the Holland America Line, as this ship will leave late in June and arrive in Holland about July 6. A train will leave that evening for Cologne.

A special jet flight, direct to Cologne, is being planned for the evening of July 6 and will arrive early on July 7. If a sufficient number enroll for this flight, a special rate will be available.

Information on travel arrangements may be obtained from C. W. Carrick, FDI travel consultant for USA section, Oberlin Bank Bldg., Oberlin, Ohio.

ATHENS DENTAL SOCIETY ELECTS OFFICERS TO COUNCIL

The Athens Dental Society in Greece, on June 25, elected officers to its Council for the term 1961-1963. The new officers are: president, Theod. J. Calocassides; vice-president, Emilios Demetriades; general secretary, Demetrius Damoulis; and treasurer, Elias Vergopoulos.

M. VINCENT DIES IN PARIS; FRENCH DENTAL PROFESSION LEADER

M. Vincent, 78, widely known secretary general of the Confédération Nationale des Syndicats Dentaires, died in Paris, May 26, 1961. Dr. Vincent was prominent not only in dentistry (he created the Regional Committee for Europe of the Fédération Dentaire Internationale in cooperation with E. Müller, the president of the German Dental Association) but also in politics as he was a member of the French parliament.

Civic and charitable activities also received Dr. Vincent's attention.

D. Charon, a Parisian dentist, will succeed Dr. Vincent as secretary general of the CNSD.

Panorama of Cologne, Germany, showing the Cathedral of Cologne, the Rhine River, and the International Exhibition Hall (in the foreground). The International Dental Congress will be held in Cologne, July 7-14, 1962.

the reader comments

THE JOURNAL *devotes this section to comment by readers on topics of current interest to dentistry. The editor reserves the right to edit all communications to fit available space and requires that all letters be signed. At the request of the author, signatures will be deleted before publication. Printed communications do not necessarily reflect the opinion or official policy of the Association. Your participation in this section is invited.* *The Editor.*

IMPLANT DENTURES

I have been secretary of the American Academy of Implant Dentures for five years, and in this capacity I have been subjected to many scathing interviews by cynical colleagues. This is a field in which we few have experienced great success, and yet we have not been granted the recognition or acceptance which is merited.

The members of the academy find closed skeptical minds at every meeting where they lecture or present clinics. Dentists feel that implantation is nothing more than a bizarre experimental procedure which has little practicable clinical application. These opinions persist despite our annual meetings, many papers published in reputable journals, one textbook (*Implant Dentures* by Gershkoff and Goldberg), and a twice-yearly journal (*The Journal of Implant Dentistry*, editor, Arthur Jermyn).

This year the American Academy of Implant Dentures is conducting an unusual program called the third International Seminar on Implants in Dentistry, in Philadelphia at the Dental School of the University of Pennsylvania, October 13-15. Dean Lester W. Burket has made available the facilities of the school, and with its department of visual education, the academy has arranged an outstanding program.

This seminar will be conducted just prior to the convention of the American Dental Association. It offers the dental practitioner an opportunity to hear and see the most minute details of the subperiosteal implant denture technic by lecture and closed circuit television presentation. It would be wonderful to have a large cross section of dentists from here and abroad represented so that a more realistic attitude can be assumed regarding this truly valuable adjunct to dental practice. Patients will be present who have had implant dentures in their mouths for periods up to 12 years. The lecturers are well known and the program appears to be a worthy presentation. (Copies of the program may be obtained by writing to me.)

I realize that it would be a more valid plea if some one not associated with implant dentistry could write this letter. Unfortunately, this is not possible. I sincerely believe that this year, an opportunity is being presented in Philadelphia for every interested dentist to clarify many conflicting and confusing thoughts regarding this highly controversial subject. It is not our concern to proselytize; rather we would like to have guests who come with open minds, reaching no conclusions until they have seen and heard.

A. Norman Cranin, D.D.S.
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Brooklyn 29, N.Y.

ANSWERS TO DENTAL PROBLEMS

The Cleveland Hearing and Speech Center of Western Reserve University has a special section devoted to the speech problems of aphasics (persons suffering loss of language and speech from brain damage often caused by cerebral vascular accidents). Aphasics are admitted to this program only after extensive testing has shown a favorable prognosis for therapy. The program has proved to be very popular and valuable.

Although some of the patients are young, the majority are in an older age bracket, and the majority of these are denture wearers. It has been observed that many of these victims of unilateral paralysis (hemiplegics) develop retention problems with their dentures after their strokes. Often this denture retention problem is severe enough to hinder the correction of the individual's speech problem.

It has been observed also that hemiplegics more often have a denture retention problem than do the patients with bilateral paralysis. This is in spite of the fact that the patients with bilateral paralysis have more gross muscle involvement.

In time, it is hoped that the work in this

aphasia section of the speech center will have some answers to the denture retention problem.

Another dental complaint which might be solved at this center is the burning tongue.

The complaint of burning tongue always has been a plague to the dental profession. Treatment usually consists of examination for possible irritations, investigation of tongue mannerism habits and the patient's eating habits, and usually always vitamin therapy, especially massive doses of the B components.

After treatment, many patients still retain the annoying burning of the tongue. Very often the dentist gives up such a patient and sends him to a physician. And again, very often, a physician is stumped by the same problem and sends the patient to a dentist. The patient may be left with no answer and a burning tongue.

Some medical authorities believe that some of the cases of burning tongue are caused by little strokes, and that nothing can be done about them.

However, this is another dental problem which the aphasia program possibly could help. Clues may be turned up as to the relationship between strokes and burning tongues. So far, all that has been noticed concerning the tongues of these hemiplegics is a rather peculiar tingling sensation which occurs as the tongue action for speech is returning because of the speech therapy.

Howard E. Kessler, D.D.S.
The Park Building
Public Square
Cleveland, Ohio

AUDIO ANALGESIA

In your editorial of November 1960 on audio analgesia, certain statements purported to be facts are not so.

Audio analgesia, a term signifying a state or action whose existence is accomplished by audio equipment and produced by distraction, may be found in the dental literature.[1-9]

The factors of safety of audio analgesia equipment have been established by specialists in the audio field, such as Earl D. Schubert, former director of research, Cleveland Hearing and Speech Center, Western Reserve University, and an expert in the field of acoustical research, who states:

"From what we know of the ear's ability to tolerate high-level sounds, the probability of any irreversible damage from these short-duration, essentially non-impulsive, exposures is small—probably negligible. Reports of levels actually called for by patients during dental treatment indicate an even greater safety factor.

"It seems prudent, however, to limit the maximum output of the transducer to a level which would virtually insure protection against auditory damage. For these broad smooth spectra, and considering the range of the phones, a maximum of 105 decibels sound pressure level has been recommended."[10]

Robert Schermer, D.D.S.
510-511 Euclid Arcade
Cleveland 15, Ohio

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6. Brier, Marjorie D. The old dental grind is just a melody in our office. TIC Mag. Feb. 1947, p. 13.

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8. Schermer, Robert. Distraction analgesia using the "stereogesic portable." Mil. Med. 12:843 Dec. 1960.

9. Podolsky, Edward. Some early experiments with music as a dental anesthetic. D. Survey 8:1088 Aug. 1960.

10. Schubert, cited by Kessler, Howard E. Auditory distraction analgesia. D. Survey 11:1460 Nov. 1960.

COMMISSION CORRECTION

There appeared in the July, 1961 issue of THE JOURNAL, an article, "Something different in uniforms" by Cimring. In this article the statement pertaining to Sara G. Krout's status as a commissioned officer in the U.S. Naval Reserve is misleading and incorrect.

No person was ever commissioned in the WAVES as such. All were commissioned in the U.S. Naval Reserve. The term was used, for sake of brevity, to indicate or designate a special group. In this case, the designation WAVES denotes "Women Accepted for Volunteer Emergency Service."

The correct interpretation in the case of Dr. Krout shows that she was indeed commissioned in the Dental Corps of the Naval Reserve with the designation "W" for woman, "S" for special service, "V" for volunteer, and "DC, USNR" for Dental Corps, U.S. Naval Reserve.

Rear Adm. Curtiss W. Schantz
Assistant Chief
Bureau of Medicine and Surgery
Navy Department Code 6
Washington, D.C.

Association staff members: your national servants

SECRETARY, COUNCIL ON DENTAL RESEARCH

Sholom Pearlman joined the Association staff in 1951 as assistant secretary of the Council on Dental Therapeutics, and in 1959 was appointed secretary of the Council on Dental Research.

Born in Ottawa, Ontario, Canada, in 1919, Dr. Pearlman attended Lisgar Collegiate Institute in Ottawa from 1932 to 1937. He received his D.D.S. degree from the Faculty of Dentistry, University of Toronto, in 1945, and an M.S. degree from Western Reserve University, Cleveland, in 1951. He served as staff dentist of the Saskatchewan Mental Hospital, Weyburn, Saskatchewan, from 1945 to 1946. From 1948 to 1951 he was a teaching fellow in biochemistry, an instructor in biochemistry and an assistant professor of biochemistry, Western Reserve University School of Dentistry, and a research assistant at that university's School of Medicine.

Dr. Pearlman served as president of the Chicago chapter of the International Association for Dental Research in 1958-1959. He is a member of the Fédération Dentaire Internationale, American Public Health Association, Society of the Sigma Xi, Illinois State Academy of Science, a Fellow of the American Association for the Advancement of Science, and a member of the National Research Council representing the American Dental Association.

Dr Pearlman is the author or co-author of a number of papers on oral biochemistry, fluoridation, and dental research. He is married and the father of seven children.

The Council on Dental Research stimulates activity in the whole field of dental research and directs the Association's testing and research program at the National Bureau of Standards and the National Institute of Dental Research. The major areas of the Council's activities are: (1) to promote, support and collect information on dental research and to make recommendations on the means and methods of improving and fostering research; (2) to investigate the causes of oral diseases and abnormalities; (3) to advise and counsel with the American Registry of Pathology in regard to the Registry of Dental and Oral Pathology; (4) to encourage the training of additional research personnel in dental fields; (5) to supply information on availability of public and private funds for dental research grants, fellowships and training grants.

Sholom Pearlman

DIRECTOR, RESEARCH DIVISION, NATIONAL BUREAU OF STANDARDS

From 1929 to 1942 George C. Paffenbarger served as research associate of the American Dental Association at the National Bureau of Standards, Washington, D.C. He received a leave of absence from 1942 to 1946 to serve in the Dental Corps of the U.S. Navy at the Naval Medical Supply Depot, Brooklyn, rising to the rank of Commodore and becoming the first Reserve Dental Officer to attain flag or general rank in all the Armed Forces. (He now holds the rank of Rear Admiral in the U.S. Navy Reserve.)

Dr Paffenbarger has served since 1946 as director of the A.D.A. Research Division at N.B.S., heading a staff of seven. The research program there emphasizes physical and chemical research.

A native of McArthur, Ohio, Dr. Paffenbarger is the second son of a pioneer Ohio dentist, Andrew Wolf Paffenbarger.

In 1924 George Paffenbarger graduated with honors from the College of Dentistry, Ohio State University. Twenty years later his alma mater conferred on him the honorary degree, Doctor of Science. In the science of dental materials he is considered a world authority. He is co-author with Wilmer Souder of a book, *The Physical Properties of Dental Materials*. He has been a consultant in dental research for the U.S. Public Health Service, the Navy and the Army Dental Services. He is a member of the Fédération Dentaire Inter-

George C. Paffenbarger

Edward G. Hampp

nationale, the Washington Academy of Science, the American Association for the Advancement of Science, and a Fellow of the American College of Dentistry. He holds membership in the New York Academy of Dentistry, Phi Sigma, Omicron Kappa Upsilon, Sigma Xi. He holds honorary memberships in the Japan Dental Association, American Denture Society, North Carolina Dental Society, and the Odontographic Society of Chicago. He has received the award of merit (1955) of the College of Dentistry, Georgetown University. In 1957 he received the Henry Spenadel Award of the First District Dental Society, New York, and in 1958 the Wilmer Souder Award, dental materials group, International Association for Dental Research. In 1958 he also received the Callahan Award of the Ohio State Dental Association and the annual award of the American Academy for Plastics Research in Dentistry. In 1959 he served as praelector on the Faculty of Medicine, St. Andrews University, Scotland; that year he also received the honorary Master of Dental Science degree from Nihon University, Tokyo.

He is married and the father of three children. His hobbies are silhouettes and farming. He is the author of more than 100 articles on dental materials and other aspects of dentistry.

SENIOR RESEARCH ASSOCIATE, NATIONAL INSTITUTES OF HEALTH

In 1941 Edward G. Hampp was appointed a Research Fellow of the American Dental Association at the National Institutes of Health in Bethesda, Md. Since 1946 Dr. Hampp has been Senior Research Associate of the Association at the Laboratory of Microbiology, National Institute of Dental Research, National Institutes of Health. Since 1941 he has been conducting research on the etiology of Vincent's infection and has studied spirochetes in general. The Association's research program at the National Institute of Dental Research is concerned primarily with the biological sciences, especially with basic research in microbiology, biochemistry and enzymology pertaining to dental caries and periodontal disease.

A native of St. Louis County, Mo., Dr. Hampp received his D.D.S. degree in 1936 from the Washington University School of Dentistry, St. Louis. He was awarded a Carnegie fellowship for graduate study, and in 1939 received an M.S. degree from the Washington University School of Medicine, his thesis being a study on the mineral distribution in the developing tooth. From 1939 to 1941 he was head of the departments of general pathology and general bacteriology at Washington University School of Dentistry and was also an instructor in pathology at the Washington University School of Medicine during the academic year of 1941.

Dr. Hampp holds an inactive reserve commission in the U.S. Public Health Service with the rank of senior dental surgeon. He holds membership in the International Association for Dental Research, the Washington Academy of Science and the Washington section of the Society of American Bacteriologists. He is a Fellow of the American College of Dentists.

Dr. Hampp is the author of many papers on the microbiology of the oral microbiota with special emphasis on the spirochetes as they may relate to the etiology of Vincent's infection. As a result of his research, he was selected by the Washington Academy of Science to receive the 1949 Academy Award in the biological sciences "in recognition of his original and fundamental contributions to the knowledge of diseases of the oral cavity, and particularly because he was first to isolate *Borrelia vincentii* in pure culture." This marked the third time that the award had been made to a scientist at the National Institutes of Health and the first time that a member of the dental profession had been distinguished by an award in basic science by the Washington Academy of Sciences.

cases and comments

TREATMENT OF TEETH DISPLACED BY TRAUMA

By Ronald L. DeCesare, D.D.S., Yonkers, N.Y., and Murray J. Plishtin,* D.D.S., East Orange, N.J.*

The patient, age 19, was admitted to an Air Force dispensary after an automobile accident in which he struck the dashboard and was injured by a blow to the mouth. Clinical and roentgenographic examination revealed that both upper central incisors had been displaced palatally, approximately 4 to 5 mm., and were now in linguoversion to the lower anterior teeth. The upper left lateral incisor had a midroot fracture and a laceration was noted on the lingual aspect of the lower lip. There were no fractures of the facial bones (Fig. 1).

The patient was seen by the authors 12 hours after the accident; treatment began immediately. The fractured upper left lateral incisor was extracted and the lip laceration was cleansed and left unsutured. The displaced central incisors were restored to normal alignment by finger pressure. A Winter arch bar was then ligated to the maxillary arch extending from second bicuspid to second bicuspid. The central incisors were immobilized by ligating them to the arch bar, and the incisal edges ground to prevent any occlusal trauma (Fig. 2). The patient was placed on penicillin therapy as a prophylactic measure and, several hours later, released from the dispensary.

Examination of the roentgenograms taken before and after immobilization indicated an increase in the periodontal space of the central incisors in their alveolar sockets. This was more pronounced in the left central incisor as it was rotated slightly and displaced more than the right central incisor.

The patient returned three times weekly for treatment, which consisted of cleansing the arch bar to prevent gingival irritation, and determining tooth vitality. Follow-up roentgenograms were taken every 10 days.

The left central incisor maintained a vital response to thermal stimuli for 10 days, and the right central incisor showed continued vitality for 35 days before loss of vitality was evident.

Examination of the postoperative roentgenograms taken at 10 day intervals showed a gradual, but noticeable, reattachment and narrowing of the periodontal space (Fig. 3).

Endodontic therapy was initiated on both central incisors 45 days following their immobilization, and was completed a week later (Fig. 4). Several days after completion of the endodontic therapy, the arch bar was removed. Both central incisors were nonmobile, and the patient was capable of chewing without discomfort. A temporary space maintainer was constructed to replace the missing left lateral incisor (Fig. 5).

A postendodontic six-week checkup further illustrated the patient's comfort and the health of the periodontal membrane (Fig. 4, right).

This case report illustrates how immobilization and endodontic therapy retained teeth displaced by trauma, and restored them to their natural alignment and function. Since these teeth have been carefully supported and treated in the critical period after their displacement, it is reasonable to assume a favorable prognosis for their continued retention.

11 Bronx River Road

The opinions or assertions contained in this article are the private ones of the writers and are not to be construed as official or reflecting the views of the Department of the Air Force or the Air Service at large.

*Formerly Captain, USAF (DC), 6520 USAF Dispensary, L. G. Hanscom Field, Bedford, Mass.

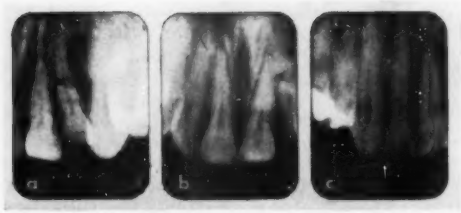


Fig. 1 • Left: Fractured left lateral incisor. Center: Displaced central incisors. Right: Increased periodontal space around right central incisor

Fig. 2 • Left: Teeth after immobilization. Right: Arch bar in place

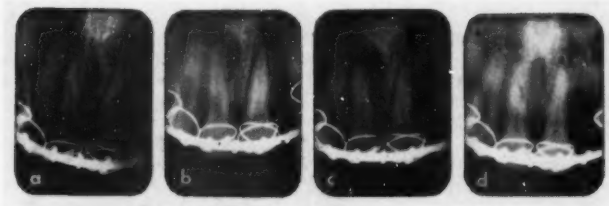


Fig. 3 • Roentgenograms taken at 10 day intervals after immobilization: a, 10 days; b, 20 days; c, 30 days and d, 40 days

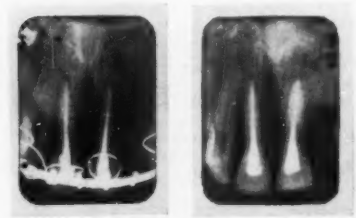


Fig. 4 • Left: Endodontic therapy completed 52 days after immobilization. Right: View taken six weeks after endodontic treatment

Fig. 5 • Space maintainer in place

TECHNICAL AIDS IN MODERN ENDODONTICS

By Julius Schnur, M.D., D.D.S., Munich, Germany, and Andreas Schnur, M.D., Detroit

Endodontic treatment requires proper mechanical preparation of the apex of the tooth without traumatization of the periapical tissue. A device has been developed which, when passed beyond the apex of the tooth, gives an absolutely accurate measure of the length of the root canal. This device, an endodontic roentgenographic probe,[1] is constructed of two metals spaced at measured distances (Fig. 1). The two metals have different radiation absorption rates. The occlusal level is indicated by a movable stop, also radiopaque. This probe is placed in the root canal and a roentgenogram made (Fig. 2). A direct reading is taken from the scale which has been projected onto the film. The amount of overextension of the probe is then subtracted from the length up to the occlusal stop. Distortion, for either shortening or elongation, is of no consequence since the scale is constant. The probe is flexible, 2 to 3 mm. in diameter, and thermostable up to 200° C. For multirooted teeth, endodontic probes with different radiopaque labels are available.

To secure uniform length of various sizes of the root canal instruments used in the preparation of the canal, the measuring ring may be used. At one end of the millimeter scale is a slot into which the occlusal stop of the (Union Broach) test handle fits. The instrument is extended on the scale and adjusted to the proper length and then locked. All types of root canal instruments may thus be checked prior to use in the root canal (Fig. 3).

To achieve proper enlargement of the root canal[2] a mechanical vibrator contra-angle handpiece may be used (Fig. 4). Broaches, reamers and files are inserted according to the required length into this handpiece. These instruments perform a vertical abrasion and can be slightly bent and adjusted for preparation of a curved root canal. On completion of manual reaming up to no. 2 or 3 to avoid ledge formation and to provide sufficient space so that a smaller engine-driven file will not bind when used in the vibrator, all further enlargement is produced by the vibrator angle handpiece. The strain of flexion put on these instruments is much less than that of torsion by the rotatory motion, thus the breaking of files or broaches is virtually eliminated. The axial motion of the vibrator contra-angle handpiece prevents the formation of a false canal.

Dentinal debris and shavings produced during the mechanical preparation should be irrigated and aspirated at intervals to avoid pushing them into the periapical region. To get sufficient cleaning and dissolution, reasonable amounts of fluids should be available. This is provided by using the irrigation cannula which was first suggested by Seidner.[3] The fused irrigating and aspirating part whose length can be regulated is inserted in the pulp chamber or upper third of the root canal. The space between the cavity and the cannula is packed by a rubber or silicon plug thus providing a closed system (Fig. 5). The vacuum maintains the continuous flow of the irrigating fluid. Different solutions can be used. They are kept in dark containers which may be electrically heated for hot steam irrigation as suggested by Prader.[4] The alternating production of negative pressure, by closing the affer-

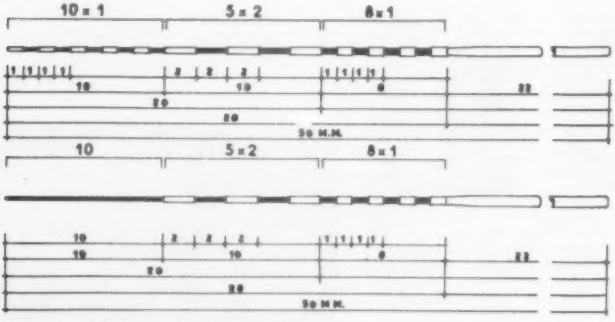
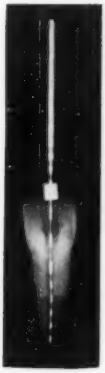


Fig. 1 • Endodontic bimetallic probes for measurement of the root canal length. The flexible and sterilizable probe consists of a scale of two metals with different roentgenographic absorption



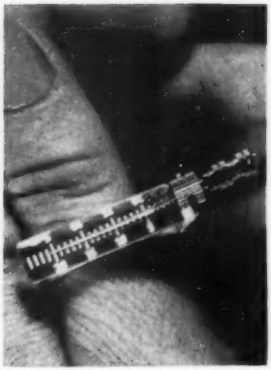


Fig. 2 • Left: View of inserted endodontic probe in root canal. Length is 21 mm.

Fig. 3 • Right: Measuring ring on left thumb facilitates sterile fixation of file in the test handle according to required length

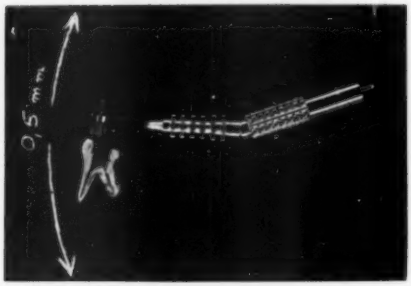


Fig. 4 • Vibrator angle handpiece for enlarging the diameter of the root canal

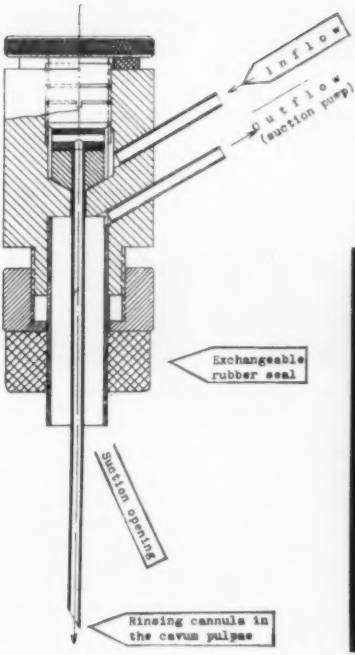
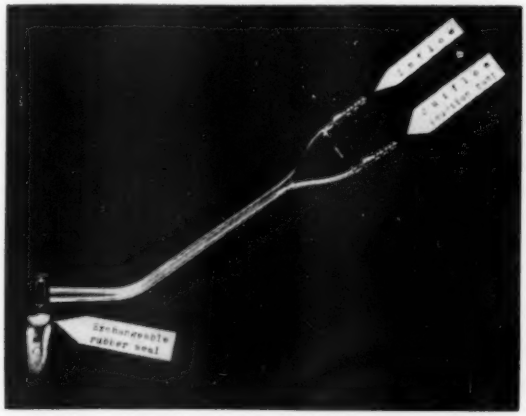


Fig. 5 • Scheme of the irrigating cannula



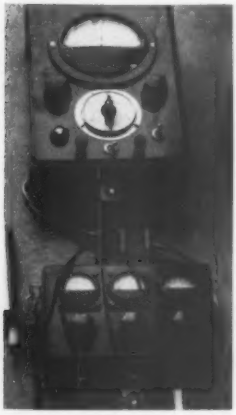


Fig. 6 • Device for simultaneous electromedication of three or four root canals. Each electrode is controlled separately

ent valve provides, by reopening, an intensified depth of penetration of the irrigating solution. Hot antiseptic solutions have an accelerated action of disinfection and are superior in dissolving lipids in necrotic pulp fragments.[5] As irrigating solutions, combinations of an antiseptic and detergent or a reducing (NaOCl) and oxidizing (H_2O_2) solution may be used alternately.

In multirooted teeth it is a time-conserving procedure to use an apparatus for iontophoresis with three or four electrodes so that several canals can be treated simultaneously. Each electrode should be controlled by a separate ammeter since the different canals may require more or less current to achieve sufficient electromedication (Fig. 6). *68 Sendlinger Street*

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2. Harndt, E. Eröffnungsansprache zum wissenschaftlichen Teil der Tagung. DZZ 10:1584 Dec. 1, 1955.

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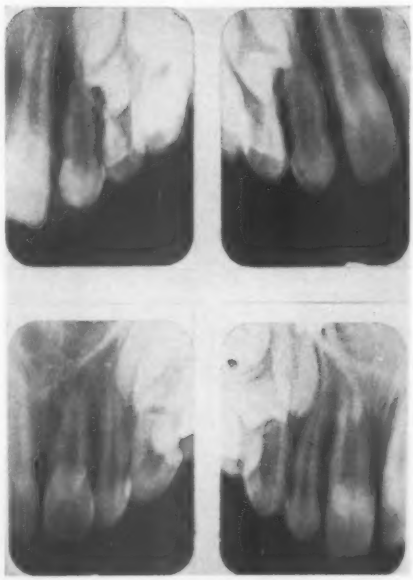
'CONGENITALLY' MISSING TEETH

By H. E. Greenberg, D.D.S., Jericho, N. Y.

The theory of identical twin formation is that the fertilized ovum splits at the two-celled stage. In the instance shown in this case report of identical twin boys, ten years old, the genetic make-up must have been the same in both embryos. Hence both twins should have the presence or absence of the lateral incisors. However, only one child has these teeth. The implication is, of course, that "congenitally missing" teeth may not be missing in all instances because of a hereditary factor, and even further, that environment may play a part.

28 Rockland Drive



Lateral incisors are missing from dentition of ten year old boy, as shown above. Lower pictures show the fully developed lateral incisors of his identical twin

book reviews

ENDODONTICS

By Harry J. Healey, D.D.S., M.S.D. 370 pages with 149 figures. Index. $7.75. St. Louis, C. V. Mosby Co., 1960.

This small volume is the outgrowth of the proceedings of the Postgraduate Dental Lecture Series given at Indiana University School of Dentistry. Dr. Healey is chairman of the division of endodontics. In a book of this size, treating with a subject as broad as endodontics, the author is obliged to limit himself closely to fundamentals, which he has done quite consistently.

The text contains 15 chapters, some of which have been contributed by capable coauthors. General discussions of etiology and treatment with a formulary of prescriptions are included. In orderly fashion the author presents the various general and specific problems of management, which are well delineated. References are made throughout the book to the work of others, in both basic and clinical aspects. Each chapter is followed by a reasonably complete bibliography. The illustrations are plentiful, clear and helpful. There is an excellent general index. The format of the book is pleasing, and the type is easy to read.

This reviewer would not go so far as to say that he is in complete agreement with all of the author's statements. Limitation of space precludes the possibility of discussion of such variances. Nevertheless, the book should serve well, as it brings the basic observations and clinical effects together, and presents the practical aspects in an unconfused and scholarly manner.

The intense interest that is now being shown in endodontics will doubtless lead many dental students and practicing dentists to examine this book for ready reference sources.

E. Alan Lieban

YOUR FUTURE IN DENTISTRY

By Raymond Cohen, D.D.S. 153 pages including an appendix of 12 pages. $2.95. New York, Richards Rosen Press, 1960.

This book describes the dental curriculum and a dental career as seen through the eyes of a practicing dentist. In addition to an interesting chapter on dental history, an unimaginative chapter on the future of dentistry and the writer's opinions concerning the requirements of a dentist, there are nine chapters devoted to detailed expositions of each of several dental specialties. A high school junior and a sophomore university student were asked for their reactions to the book, which are incorporated in this review. Although there was no collaboration, their opinions were strikingly similar, with the added comment from the university student that the style was too juvenile.

With recruitment of best qualified students to study dentistry one of the major problems facing the profession, the mission of this book if achieved would be most commendable. Its apparent objective was to interest the reader in dentistry as a career but both young readers felt that it fell short of its purpose. Much of the book dealt with the detailed practice of specialties and both readers felt this presentation was out of place to one who had practically no knowledge of dentistry as a whole. This reviewer concurs in the criticism for it seemed to segment consideration of a professional career which had not yet been molded into a cohesive pattern. Almost the entire coverage of general dentistry consisted of an excerpt from the letter of a dentist describing his own professional life. It is the opinion of this writer that consideration of the choice of a specialty should follow rather than precede a general professional education.

The major criticism of the presentation is

that it deals almost exclusively with current technical procedures related to the restorative aspect of dental service. Preventive measures to control the tremendous accumulation of dental disease, opportunities for improving the total well-being of the individual through oral health education and treatment, the place of dental service as a healing science were scarcely mentioned. With predicted increased demands for improved standards of oral health by an explosively growing population, dentistry of the future, if confined to the practices described in this book, could scarcely justify professional stature in our society.

If young men and women of vision, professional enthusiasm and dedication to the service of humanity through acquiring knowledge and skill in dental science are to be attracted to dentistry of the future, a greater challenge must be offered than is contained in this book. It well may be that the complex nature of dental practice of the future is beyond comprehension of a single mind. Perhaps it might be well to allow documentary attempts at recruitment to be prepared or at least sponsored by cognizant official bodies of the Association or its components.

Kenneth O. Turner

DENTAL HEALTH EDUCATION

By Frances A. Stoll. Second edition. 253 pages, illustrated. Index. $5.50. Philadelphia, Lea & Febiger, 1960.

The 1957 edition of this book has been completely revised. New materials have been added to each of the original 13 chapters and illustrations have been used effectively to make the reading more meaningful and interesting.

A new chapter, "The growth and function of the mouth and teeth," has been added to provide the nondental reader with information on the physiology and anatomy of the mouth and its related parts.

The book is particularly useful to anyone—teacher, dental hygienist, dentist or school administrator—who is concerned with the development or improvement of school dental health education programs. There is, however, considerable duplication of material relating to educational principles and philosophy that teachers would have received in other courses. On the other hand, the inclusion of this material can be justified on the basis that the book is perhaps a basic educational text for dental hygienists who will be employed in schools or public health departments.

The practicing dentist will find the book useful in that it includes much valuable information on the use of audiovisual materials and an appendix which describes and explains the many opportunities for patient education in the dental office.

Dental Health Education is a fine reference for anyone interested in learning more about this new field.

Perry Sandell

TECHNIC TRAINING IN ORTHODONTICS

By Earl W. Renfroe, D.D.S. 230 pages with 355 illustrations. Index. $20. Ann Arbor, Edwards Brothers, Inc., 1960.

With this text the author has provided orthodontics with perhaps its most comprehensive manual on the fabrication of appliances for the correction of malocclusion of the teeth. As the title specifies, the book is concerned chiefly with orthodontic technic. The emphasis is on the edgewise mechanism but the mechanical principles as described are such that they also can be applied to any of the other appliances currently in use.

The book is divided into eight parts, beginning with the basic orthodontic technics of wire adaptation, soldering, welding, and band construction. The procedures described deal primarily with precious metal appliances. Proper emphasis is placed on tooth anatomy and dental arch form in determining band placement, bracket position, and arch wire design. Excellent illustrations provide the reader with visual evidence of the ideal in appliance construction as advocated by the author.

The second half of the text is devoted to the accessory attachments that have been developed to increase the mechanical efficiency of the edgewise appliance. These include such auxiliary aids as staples, stops, rotation levers, vertical loops, coil springs, intermaxillary hooks, and extraoral traction. Preformed steel bands and attachments are illustrated but steel fabrication is not stressed in the text. This omission is not serious; more important is the precise technic that is described and this can be applied to either steel or gold. The currently popular light wire multiple-loop devices are mentioned briefly. The author probably preferred to limit his text to well-established basic technics as traditionally used with the edgewise appliance.

The closing chapters are concerned with arch wire fabrication for the effective movement of teeth, the associated problems in anchorage, and retention after treatment. Again the emphasis is on technic but this in turn makes it possible to include many valuable comments on treatment procedures not ordinarily found in a manual on technic. These

later chapters also contain indications for appliances other than the edgewise mechanism.

Although the book is designed primarily as a teaching manual for graduate orthodontic students, the experienced orthodontist will find that it not only confirms many of his present technical procedures but also describes a few new ones he has not yet put to use.

B. F. Dewel

PARTIAL DENTURE CONSTRUCTION PRINCIPLES AND TECHNIQUES

By William L. McCracken. 528 pages with 270 illustrations. Index. $14. St. Louis, C. V. Mosby Co., 1960.

This book contains 24 chapters covering the usual diagnosis and treatment planning, classification, surveying and principles of partial denture design. The first chapter, on terminology, should be helpful in understanding the author as well as standardizing this neglected area of dentistry. Subsequent chapters discuss the component parts of a removable partial denture.

Special attention is given to mouth preparation, surgical and periodontal treatment, endodontic considerations regarding abutment teeth and preparation of abutment teeth. A variety of time-proven types of preparations and retainers are described and illustrated. This phase is more complete than usually is found in a text on removable partial dentures.

Other areas given heavy emphasis are support for the free-end denture base and occlusal relationships for partial dentures. Establishing occlusion by the recording of occlusal pathways is thoroughly explained and illustrated by photographs of clinical cases. This is done so well that a beginner in the art should be able to proceed with reasonable confidence. Sixty-three pages are devoted to laboratory procedures. There is a chapter on miscellaneous partial prosthodontics which discusses cleft palate prosthesis and touches on maxillofacial prosthesis. A few pages on repairs and additions to partial dentures may be helpful to some.

The book is well written, easy to read and beautifully illustrated both by photographs and line drawings. It follows in principle the Applegate concept of removable partial dentures and contains additional valuable material as previously mentioned. It should be popular as a textbook in undergraduate teaching because it is complete and easy to understand. The paper and binding are of the usual quality of American publishers of 1960 and should last until the book is revised.

Monte G. Miska

DEN NORSKE TANNLAEGEFORENING GJENNEM 75 ÅR: 1884-1959 (THE NORWEGIAN DENTAL ASSOCIATION DURING 75 YEARS: 1884-1959)

By Jacob Ramm. 355 pages with 200 illustrations. Norweg. Kroner 50. Oslo, Norwegian Dental Association, 1959.

Here is a book that sets a standard in recapitulating the history of a great dental organization; in this case the Norwegian Dental Association, which played an important part in the advances made in and by Scandinavian dentistry.

The author, a distinguished historian, exhibits an uncanny ability in reporting the most significant historical events fully and in glancing over (or discarding) less important events. This becomes evident in the chapters dealing with the more recent activities of the association and its executive officers. This part of the book is written with a charming simplicity and clearness seldom found in the historical literature.

American dentists, especially those interested in the history of dentistry, will enjoy reading this book because it describes the founding of the Norwegian Dental Association by a handful of practicing dentists in 1884 who, by their talents and devotedness, did as much for the Scandinavian dental profession as the founders of the American Dental Association in 1859 did for the profession in the United States.

The founders as well as the presidents of the association, beginning with H. O. Heide and ending with Sigurd Vik, are described as outstanding men whose influence and activities have made a permanent record in Scandinavian, not solely dental, history.

Fascinating are the author's descriptions of the characteristics of the individual secretaries-general of the association from Carl Kraus (1884) to Knut Vikar Gard (1959), as well as the presentation of the work performed by the editors of the official journal, *Den Norske Tannlaegeforenings Tidende*, now in its seventieth year.

Undoubtedly, the preparation of this historical work required an enormous amount of research, best demonstrated by the many pages of notes and references which document statements and events recorded in the text.

The book, despite a few minor flaws (some uneveness in the treatment of the initial years after the founding of the association), can be compared favorably with the many works on the history of dental associations and societies which have appeared recently. The members of the international dental profession can take pride in the deeds of their Norwegian con-

freres. This excellent book, outstanding in its typography, quality of paper and reproduction of illustrations as well as in its binding, may be counted among those deeds.

Paul H. Glucksman

THE SCIENCE OF DENTAL MATERIALS

By E. W. Skinner and R. W. Phillips. Fifth edition. 636 pages. Illustrated, indexed. $9.50. Philadelphia, W. B. Saunders Co., 1960.

Like previous editions, *The Science of Dental Materials* is a most valuable text, both for the student and the practitioner. The addition of a co-author brings together two outstanding men in this field.

Each chapter reflects the authors' qualifications both as researchers and as teachers by the manner of presentation. The 36 chapters are well conceived, organized and illustrated. The illustrations are clear, well placed and amplify the text. The index is complete and most usable, making the book as handy a reference as it is a complete text.

Each of the restorative materials as well as the accessory materials used in dental practice is discussed in terms of composition, physical and chemical properties and the important aspects of its selection, manipulation and application. While ample technical evidence is presented to substantiate the discussions, the authors have effectively interpolated this into valuable suggestions on the clinical management of the materials. The new chapter on dental burs, cutting mechanics and power sources is a welcome addition.

Neither the dentist, his assistant nor his laboratory technician should consider their library complete without a copy.

Robert J. Nelsen

DENTAL PRACTITIONERS' FORMULARY 1960

Compiled by the Joint Formulary Committee. Fourth edition. 54 pages. 3s. 6d. London, The British Medical Association, 1960.

It is unusual to find a 54 page paper-bound booklet weighing well under two ounces which warrants full-scale review. However, this one constitutes a sort of bible for British dentists, because it lists the preparations which they may prescribe, free of cost to their patients, under the terms of the British National Health Service Act. It also includes some good advice with regard to the probable usefulness of various prescribable medicines in dentistry.

The format of the drug list is antiquated, and pharmaceutical in pattern. The preparations are listed under the principal headings (in Latin) of capsules, poultices, mouthwashes, elixirs, gargles, glycerins, and so on, rather than in the modern pharmacologic classes. The titles of the preparations themselves are given first in Latin, then in English. The apothecaries system of weights, measures and dosages is used primarily, but is supplemented where essential by the metric.

The list includes almost all the preparations which a dentist would need to prescribe, as well as many which are unnecessary or even undesirable, such as formaldehyde throat tablets, ferric chloride gargle, and calomel tablets. No atropine preparations are included, however, and most dentists would consider atropine important.

The Dental Practitioners' Formulary is prepared by the Joint Formulary Committee with the advice of its Dental Formulary Subcommittee. It is published by the British Medical Association. It is not clear whether the Joint Formulary Committee is an agency of the British Medical Association, or of the (British) Pharmaceutical Society, or both. The Joint Formulary Committee consists of 39 members, one of whom is a dentist. The Dental Formulary Subcommittee has nine members, four of whom are dentists.

It seems possible that a better selection of drugs would have been made if the dental profession had been more generously represented on the Joint Committee.

Donald A. Wallace

PHYSICAL PHARMACY: PHYSICAL CHEMICAL PRINCIPLES IN PHARMACEUTICAL SCIENCE

By Alfred N. Martin. 692 pages with 108 tables and 168 illustrations. Index. $15. Philadelphia, Lea & Febiger, 1960.

This book is directed to the needs of undergraduate students in pharmacy, but it should be of considerable interest to any individuals in the medical sciences who are interested in the construction, stabilization, and evaluation of medicinals. For example, topics include the kinetics of drug absorption, distribution, and elimination, and a discussion of sustained release medication.

The 22 chapters are clearly written and well illustrated. It is designed to be used as a textbook for a first course in physical pharmacy, a course based on one year of college mathematics and one which does not require physical chemistry as a prerequisite. It is in

many ways an elementary textbook on physical chemistry and covers the topics normally found in a first course in that subject. It also includes sections dealing with the complexes "micromeritics," solubilization, emulsions, suspensions, and semisolid dispersions. Some of the principles of thermodynamics are introduced in an early chapter. A section on the calculus is included later as a basis for the discussion of kinetics, colloidal phenomena, and a later section on thermodynamics.

The term "physical pharmacy" is of relatively recent origin and there has been considerable question as to what areas of scientific knowledge it should include. This volume is to the reviewer's knowledge the first book to be published with the title *Physical Pharmacy* and as such it is being scrutinized very closely as to scope and depth of presentation.

This outstanding book does a great deal to fill a long-felt need for a text in this field, and should do much to stimulate the writing of the more advanced texts which are also needed.

The wealth of journal references, worked samples, problems with answers, and the extensive general bibliography, add substantially to its value. Most of the examples and problems use medicinals to illustrate fundamental scientific concepts.

Information on drugs which has been accumulated in tables for the first time includes isotonic values, dissociation constants, solubility data, oxidation potentials, stability constants of complexes, and the pH of a number of pharmaceutical specialties.

Dwight L. Deardorff

THE CLASSIFICATION AND TREATMENT OF INJURIES TO THE TEETH OF CHILDREN

By Roy G. Ellis. Fourth edition. 250 pages with 164 illustrations. Index. $4.50. Chicago, The Year Book Publishing Inc., 1960.

This excellent manual should be on the reference bookshelf in every dental office. It provides information in a concise and lucid form for the dentist confronted with the problem of caring for an accidentally injured incisor. The injuries, ranging from a simple chipping of the enamel to instances involving the pulp, are classified on an illustrated chart and a chapter on treatment of each class describes the methods of procedure. Where a deciduous or a permanent tooth is completely lost, devices for holding the space are suggested and their construction is described.

One of the difficulties in treatment of young teeth is the restoring of missing tooth substance. Dr. Ellis shows his methods for constructing crowns for these teeth and also includes ideas successfully used by other operators.

Prevention of these injuries has been given consideration and a method for constructing a mouth guard is described.

The chapters are well supplied with references for further reading which makes the book valuable for students and those wishing to acquire more information regarding this important subject. *Elsie Gerlach*

MODERN PRACTICE IN CROWN AND BRIDGE PROSTHODONTICS

By John F. Johnston, Ralph H. Phillips and Roland W. Dykema. 420 pages with 385 illustrations. Index. $12. Philadelphia, W. B. Saunders Co., 1960.

The authors of this book, all of whom are professors in the Indiana University School of Dentistry, have produced a textbook "planned for the particular needs of the undergraduate student."

Thorough consideration is given to the indications and contraindications for bridges, including diagnosis and treatment planning. The chapters on tooth reduction and technic for tooth preparation for gold crowns, gold crowns veneered with acrylic resins and with fused porcelain are complete with detailed descriptions and illustrations. Inlay retainers, pinledge and MacBoyle retainers also are described.

The chapter on casting is good and contains some pointers for the practitioner whose castings may not be consistently satisfactory.

Bridge construction is discussed in two chapters, one describing the direct technic and the other the indirect technic with hydrocolloid and with rubber-base impression materials. The technic of preparing the pontic is adequately described, as are the technics and principles of soldering and cementation of the bridge.

A chapter on bridge patterns, in which the authors suggest the type of retainer and pontic to be used to replace missing teeth in different locations in the maxilla and mandible, invites careful study and should be a useful reference guide for the practitioner.

Jacket crowns of baked porcelain and of acrylic resin are discussed and described in considerable detail. Although the authors favor the use of porcelain where practicable and wish to limit the use of resin to incisors and cuspids, it was with some surprise that this reviewer found such favorable comment on the resin jacket.

This book does not include a complete

treatise on partial dentures but there is a valuable chapter on the construction of crowns and bridges in the preparation of partially edentulous mouths for clasp-retained removable prostheses.

The final chapter includes two case histories, one of a four-unit and the other of a 12-unit bridge. These are depicted through illustrations and captions.

The paper and binding of this work are of good quality and the type makes for easy reading. *Robert E. Blackwell*

ENCYCLOPEDIA OF MEDICAL SYNDROMES

By Robert H. Durham. 628 pages. Index. $13.50. New York, Paul B. Hoeber, Inc., Medical Division of Harper & Brothers, 1960.

The usefulness of this extensive, cross-indexed encyclopedic text of eponymic and descriptive syndromes is readily obvious since information has been brought together for easy reference which is nowhere else so readily available. The encyclopedia should, indeed, be of interest to both the casual reader and the medical specialist in innumerable fields.

To appreciate this reference text, the terms "syndrome" and "disease," which the author notes are often unwittingly used interchangeably even though they are not synonymous, must be appreciated. "Typical syndromes are usually either congenital, familial, or hereditary and are the result of genetic abnormality. These variations depend upon the presence of a single pleiotrophic gene or of two or three linked genes. Not infrequently such inherited abnormalities include an inexplicable combination of two, three, or even four seemingly unrelated conditions."

The author has handled his subject matter adequately for the space at his disposition. The material is briefly presented and easily read. It has not been organized as to subject matter, a seemingly important but perhaps impossible task, inasmuch as the components of the syndromes vary fantastically amongst themselves. Type size and style are readable. Quality of paper and binding is acceptable.

There will be many who feel that the thumbnail description of these innumerable syndromes is too sketchy and unsatisfying to the reader even though one or more suitable references are presented for each syndrome which the eager investigator, student, or reader may consult for further details. One would hesitate to make important medical decisions based on the knowledge presented on any given syndrome in this volume.

One might also question whether the list of synonyms, one of the most important aspects of this book, is entirely complete.

Nevertheless, this reference text will be valued—especially by those who feel that the ability to know where to find out about a disease is second only to knowing about the disease itself. *Austin H. Kutscher*

BOOKS RECEIVED BUT NOT REVIEWED

HANDBOOK OF MEDICAL TREATMENT • Edited by Milton J. Chatton, M.D., Sheldon Margen, M.D., and Henry Brainerd, M.D. 7th ed. 569 pages. $3.50. Lange Medical Publications, P.O. Box 1215, Los Altos, Calif., 1960.

REVIEW OF MEDICAL MICROBIOLOGY • By Ernest Jawetz, M.D., Joseph L. Melnick, Ph.D., and Edward A. Adelberg, Ph.D. 4 ed. 376 pages with illustrations. $5. Lange Medical Publications, P.O. Box 1215, Los Altos, Calif., 1960.

SCIENCE PROJECTS HANDBOOK • Edited by Shirley Moore (Science Clubs of America). 253 pages with illustrations. 50c plus 5c for packing (paperbound). Science Service, 1719 N St., N.W., Washington 6, D.C., 1960.

MENTAL HEALTH EDUCATION: A CRITIQUE • By Pennsylvania Mental Health, Inc., cosponsored by the American Psychiatric Association and the National Association for Mental Health, Inc. 180 pages. Pennsylvania Mental Health Inc., 1601 Walnut St., Philadelphia 3, 1960.

HOW YOUR GOVERNMENT MAKES IT POSSIBLE FOR EMPLOYEES TO RETIRE RICH • By Research and Reporting Register. 92 pages. Research and Reporting Register, P.O. Box 641, Rochester 3, New York.

AGING—SOME SOCIAL AND BIOLOGICAL ASPECTS • Edited by Nathan W. Shock. 427 pages with illustrations. $8.50. American Association for the Advancement of Science, 1515 Massachusetts Ave., N.W., Washington 5, D.C., 1960.

FOR DOCTORS ONLY: MEDICINE COULD BE VERSE • By Karl L. Sicherman, M.D. 64 pages. $2.50. Exposition Press, 386 Fourth Ave., New York 16, 1961.

deaths

BUREAU OF MEMBERSHIP RECORDS

Mercer, Cabell T., Portsmouth, Va.; Medical College of Virginia School of Dentistry, 1915; died October 30; age 66.

Merritt, Arthur H., New York; New York College of Dentistry, 1895; died February 9; age 90.

Michener, Vernon H., Shelby, Ohio; Starling-Ohio Medical College Department of Dentistry, 1909; died October 26; age 78.

Mierley, Clyde V., Huntingdon, Pa.; University of Pennsylvania School of Dentistry, 1901; died October 26; age 82.

Miller, Kenneth L., White Plains, N. Y.; University of Nebraska College of Dentistry, 1929; died August 7, 1960; age 53.

Miller, Lawrence F., Kansas City, Mo.; Kansas City-Western Dental College, 1925; October 14; age 58.

Miller, Max E., Lake Park, Iowa; University of Iowa College of Dentistry, 1927; died October 16; age 55.

Miller, William N., Flint, Mich.; Chicago College of Dental Surgery, 1911; died February 4; age 71.

Mitchell, Roland S., Detroit; University of Michigan School of Dentistry, 1897; died December 6; age 84.

Mitran, Andrew E., Chicago; Northwestern University Dental School, 1944; died January 14; age 40.

Moag, James A., Indianapolis, Ind.; Indiana Dental College, 1908; died October 10; age 80.

Moll, Clifford F., Rochester, N. Y.; University of Buffalo School of Dentistry, 1902; died December 8; age 79.

Montiel, Everardo J., Tampa, Fla.; St. Louis University School of Dentistry, 1942; died December 11; age 46.

Moody, Robert S., Cody, Wyo.; University of Denver School of Dentistry, 1913; died December 14; age 77.

Moon, William L., Eureka, Calif.; College of Physicians and Surgeons, School of Dentistry, 1955; died December 7; age 37.

Moreland, Rufus I., East St. Louis, Ill.; St. Louis University School of Dentistry, 1908; died January 23; age 75.

Morgenthaler, Carl F., Hammond, Ind.; Indiana Dental College, 1918; died December 19; age 65.

Moriarty, Elliott P., Pittsburgh; University of Pittsburgh School of Dentistry, 1925; died October 11; age 57.

Mosby, McRae V., Meridian, Miss.; Atlanta-Southern Dental College, 1926; died September 29, 1960; age 61.

Moynihan, Eugene F., Irvington, N. J.; Temple University School of Dentistry, 1935; died October 25; age 55.

Mudge, Edward J., Marquette, Mich.; University of Michigan School of Dentistry, 1913; died December 28; age 78.

Muller, Isaac, New York; University of Minnesota School of Dentistry, 1943; died December 1; age 64.

Munley, James J., Miami, Fla.; Medico-Chirurgical College of Philadelphia, 1915; died September 13, 1960; age 70.

Munson, Wilford G., New Haven, Conn.; University of Pennsylvania School of Dentistry, 1912; died August 21, 1960; age 73.

Myers, Warren C., Bedford, Mass.; University of Pittsburgh School of Dentistry, 1941; died November 24; age 46.

Nelson, Franklyn C., Pomona, Calif.; College of Physicians and Surgeons, School of Dentistry, 1944; died January 7; age 42.

Nenneker, Charles J., Evansville, Ind.; Indiana University School of Dentistry, 1927; died November 3; age 55.

Nevins, Charles L., Le Mars, Iowa; University of Iowa College of Dentistry, 1910; died November 10; age 81.

Noll, Brooks, Chattanooga, Tenn.; University of Tennessee College of Dentistry, 1949; died December 29; age 41.

Nordstrom, Morris D., Norwalk, Conn.; New York University College of Dentistry, 1949; died October 17; age 59.

Oberg, Axel T., Kansas City, Mo.; McGill University Faculty of Dentistry, Montreal, Canada, 1917; died October 12; age 73.

O'Brien, John A., Germantown, Pa.; University of Pennsylvania School of Dentistry, 1901; died November 11; age 83.

O'Brien, William A., Greenfield, Mass.; Tufts College Dental School, 1913; died October 24; age 68.

O'Connell, John S., Miami, Fla.; Temple University School of Dentistry, 1916; died September 17, 1960; age 66.

O'Connell, Thomas J., Hawthorne, Calif.; North Pacific College of Oregon School of Dentistry, 1941; died November 16; age 46.

Orloff, Leo, Chicago; University of Illinois College of Dentistry, 1916; died November 9; age 75.

Pascher, Max, Union City, N. J.; Pennsylvania College of Dental Surgery, 1909; died November 4; age 71.

Patrick, Charles S., Charleston, S. C.; Southern Dental College, 1908; died November 11; age 73.

Pearson, Edward H., Minneapolis; University of Minnesota School of Dentistry, 1918; died September 17, 1960; age 63.

Peck, Frank M., Denver; Denver College of Dentistry, 1896; died December 1; age 88.

Peebles, Arthur C., Ashtabula, Ohio; Cincinnati College of Dental Surgery, 1900; died February 7; age 85.

Perdue, Givhan N., Fort Valley, Ga.; Southern Dental College, 1916; died November 5; age 67.

Perner, Lorenz H., Blythe, Calif.; University of Southern California School of Dentistry, 1918; died December 19; age 67.

Pheneger, Charles R., Vermilion, Ohio; Western Reserve University School of Dentistry, 1907; died September 3, 1960; age 79.

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Pollack, Herman G., Millburn, N. J.; Kansas City-Western Dental College, 1933; died January 15; age 51.

Pomeranz, Max, New York; New York College of Dentistry, 1914; died December 31; age 70.

Porter, William M., St. Petersburg, Fla.; Vanderbilt University School of Dentistry, 1909; died November 5; age 80.

Postilion, Louis, Chicago; Chicago College of Dental Surgery, 1918; died February 5; age 69.

Prail, Theodore W., Walnut Grove, Minn.; Northwestern University Dental School, 1914; died October 13; age 68.

Prees, Robert J., Green Bay, Wis.; Marquette University School of Dentistry, 1924; died November 24; age 72.

Price, Charles R., Topeka, Kan.; Meharry Medical College School of Dentistry, 1913; died November 20; age 75.

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Prince, Robert A., St. George, Utah; University of Southern California School of Dentistry, 1947; died December 19; age 36.

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Ream, Thomas W., Somerset, Ohio; Ohio State University College of Dentistry, 1918; died November 14; age 63.

Reed, Robert W., Omaha; Northwestern University Dental School, 1909; died September 21, 1960; age 77.

Reichard, Samuel, Brooklyn; New York College of Dentistry, 1919; died February 4; age 71.

Reichman, Irvin, Philadelphia; Temple University School of Dentistry, 1946; died January 20; age 38.

Reilly, Bernard H., Yauco, Puerto Rico; Baltimore College of Dental Surgery, University of Maryland, 1937; died November 26; age 49.

Reilly, John E., Wallace, Idaho; Northwestern University Dental School, 1903; died November 19; age 81.

Remele, Henry W., Crookston, Minn.; University of Minnesota School of Dentistry, 1905; died October 31; age 80.

Reynard, Lamar S., Mount Vernon, Ohio; Ohio State University College of Dentistry, 1930; died November 9; age 55.

Reynolds, Lon V., Eaton, Ohio; Ohio College of Dental Surgery, University of Cincinnati, 1901; died August 27, 1960; age 84.

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Richey, Robert M., Springfield, Mass.; Tufts College Dental School, 1930; died November 2; age 53.

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Robbins, Samuel N., New York; New York College of Dentistry, 1913; died November 3; age 70.

Roberts, Zenas T., Denver; University of Denver School of Dentistry, 1905; died December 29; age 84.

Robinson, Leonard G., Valparaiso, Ind.; Indiana University School of Dentistry, 1933; died November 12; age 60.

Robinson, Leopold L., Los Angeles; Meharry Medical College School of Dentistry, 1924; died January 25; age 64.

Robinson, Nathan R., Brooklyn; Columbia University School of Dental and Oral Surgery, 1927; died November 25; age 55.

Robinson, Richard D., Canton, Ohio; died January 17.

Rollin, Claus A., Minneapolis; University of Minnesota School of Dentistry, 1906; died September 20, 1960; age 83.

Rose, Charles M., Kansas City, Mo.; Louisville College of Dentistry, 1904; died December 28; age 79.

Rosof, Irving L., Brooklyn; New York University College of Dentistry, 1928; died November 8; age 54.

Roulette, Wayne N., Detroit; University of Michigan School of Dentistry, 1916; died December 7; age 67.

Rowitt, Irwin M., Armonk, N. Y.; New York College of Dentistry, 1917; died October 4; age 65.

Roy, Joseph C., Monroe, La.; Howard University College of Dentistry, 1914; died September 26, 1960; age 74.

Rubin, Samuel, New York; New York College of Dentistry, 1914; died August 22, 1960; age 67.

Rugg, Porter D., Kent, Wash.; North Pacific College of Oregon School of Dentistry, 1924; died January 14; age 68.

Ryan, William F., Pekin, Ill.; Indiana University School of Dentistry, 1928; died November 6; age 58.

Ryle, Jeremiah J., Stamford, Conn.; Medico-Chirurgical College of Philadelphia, 1902; died December 5; age 81.

Sabin, Manuel S., Chicago; Chicago College of Dental Surgery, 1923; died January 24; age 65.

Saghirian, Levon M., Philadelphia; University of Pennsylvania School of Dentistry, 1924; died January 17; age 58.

Sawyer, Frederick K., Bangor, Maine; Philadelphia Dental College, 1905; died October 30; age 81.

Schapiro, Max M., New York; New York University College of Dentistry, 1937; died December 14; age 46.

Scheim, Charles S., New York; New York College of Dentistry, 1916; died January 16; age 68.

Schilling, Alfred H., Carlstadt, N. J.; Baltimore College of Dental Surgery, University of Maryland, 1935; died November 23; age 49.

Schnebly, John S., Mount Vernon, Ohio; Ohio State University College of Dentistry, 1924; died November 27; age 67.

Schwartz, Philip L., New Brunswick, N. J.; New York College of Dentistry, 1917; died December 15; age 66.

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Sears, Harry E., Chicago; Northwestern University Dental School, 1901; died November 17; age 84.

Sencindiver, Jacob P., Catonsville, Md.; Baltimore Medical College, Dental Department, 1903; died November 2; age 82.

Settell, Ansel R., Bloomfield, Neb.; University of Iowa College of Dentistry, 1906; died November 8; age 75.

Shapero, George O., Cleveland; Western Reserve University School of Dentistry, 1917; died October 27; age 64.

Sharp, George C., Pasadena, Calif.; New York College of Dentistry, 1897; died January 13; age 86.

Shaw, Herbert W., Milford, Mass.; Philadelphia Dental College, 1897; died November 22; age 90.

Shaw, Marion R., Tulsa, Okla.; Kansas City Dental College, 1912; died October 11; age 68.

Shepherd, William H., Baytown, Texas; died September 23, 1960; age 83.

Shiffman, Louis, New York; New York College of Dentistry, 1915; died December 9; age 70.

Shumate, Malcolm W., Beckley, W. Va.; University of Pittsburgh School of Dentistry, 1944; died January 12; age 45.

Sigall, Louis M., New York; New York Col-

lege of Dentistry, 1921; died November 9; age 60.

Silverberg, Jacob J., Los Angeles; Western Reserve University School of Dentistry, 1918; died December 4; age 63.

Simon, Herman, Chicago; Chicago College of Dental Surgery, 1916; died December 12; age 71.

Singher, Alexandre, Bronx, N. Y.; New York College of Dentistry, 1909; died January 21; age 78.

Slaughter, Pendleton J., Woodbury, N. J.; Tulane University School of Dentistry, 1924; died November 29; age 64.

Small, Clifford T., Boston; Harvard Dental School, 1930; died October; age 54.

Smith, Alexander C., Lineville, Ala.; Atlanta Dental College, 1902; died September 20, 1960; age 85.

Smith, Harold R., Brighton, Mass.; Tufts College Dental School, 1931; died December 14; age 55.

Smith, Howard J., Hughesville, Pa.; Temple University School of Dentistry, 1925; died November 11; age 61.

Smith, Ray, Newtown, Conn.; University of Iowa College of Dentistry, 1897; died December 5; age 88.

Smith, Robert A., Chattanooga, Tenn.; Atlanta Dental College, 1915; died December 28; age 69.

Smith, Wiley W., Baltimore; Baltimore College of Dental Surgery, University of Maryland, 1900; died December 21; age 84.

Snyder, Samuel J., St. Petersburg, Fla.; Medico-Chirurgical College of Philadelphia, 1916; died November 11; age 67.

Sobelman, Joseph, Chicago; Chicago College of Dental Surgery, 1920; died November 12; age 66.

Soja, Richard A., Fall River, Mass.; Baltimore College of Dental Surgery, University of Maryland, 1935; died December 14; age 49.

Spalding, Edward B., Orchard Lake, Mich.; University of Michigan School of Dentistry, 1892; died November 2; age 92.

Squires, Charles W., Sonora, Calif.; University of California College of Dentistry, 1925; died December 2; age 58.

Stahl, Harvey E., New Rochelle, N. Y.; College of Dental and Oral Surgery, 1904; died October 11; age 79.

Stansbury, William L., Willows, Calif.; North Pacific College of Oregon School of Dentistry, 1917; died December 25; age 80.

Stark, William J., Indianapolis; Indiana Dental College, 1914; died December 23; age 67.

Steeves, Simeon A., Miami, Fla.; University of Pennsylvania School of Dentistry, 1910; died September 20, 1960; age 73.

Steinmeyer, John A., Topeka, Kan.; Western Dental College, 1896; died December 2; age 89.

Sterenberg, John, Holland, Mich.; University of Michigan School of Dentistry, 1932; died October 27; age 54.

Stewart, Joseph F., Wauchula, Fla.; Louisville College of Dentistry, 1912; died December 24; age 76.

Stickle, Francis N., Spokane, Wash.; North Pacific College of Oregon School of Dentistry, 1945; died January 2; age 43.

Stinson, Jamie T., Jonesboro, La.; Tulane University School of Dentistry, 1923; died November 22; age 63.

Stoops, Harry H., Pennsboro, W. Va.; University of Pittsburgh School of Dentistry, 1918; died October 9; age 64.

Sucharoff, Solomon A., Chicago; Chicago College of Dental Surgery, 1912; died October 24; age 74.

Sutton, Arthur, Norristown, Pa.; University of Pittsburgh School of Dentistry, 1911; died December 28; age 81.

Swanson, Harry G., Bremerton, Wash.; North Pacific College of Oregon School of Dentistry, 1923; died November 14; age 65.

Sweeney, Pruitt O., Louisville, Ky.; Meharry Medical College School of Dentistry, 1925; died October 10; age 64.

Swenson, John W., Grand Junction, Colo.; University of Denver School of Dentistry, 1926; died November 6; age 60.

Sykes, George J., Wilmington, Del.; Howard University College of Dentistry, 1909; died December 11; age 79.

Talcoff, William J., Boston; Harvard Dental School, 1918; died January 30; age 64.

Tansey, John A., Easthampton, Mass.; University of Maryland, Dental Department, 1913; died October 30; age 69.

Taylor, Clifford R., Lansing, Mich.; St. Louis University School of Dentistry, 1933; died November 5; age 51.

Thomas, D. Waldo, Chicago; Chicago College of Dental Surgery, 1934; died November 6; age 57.

Thompson, Frederick C., Rochester, N. Y.; McGill University Faculty of Dentistry, Montreal, 1926; died January 12; age 59.

Tippery, Guy S., Altoona, Pa.; University of Pennsylvania School of Dentistry, 1908; died August 14, 1960; age 81.

Titus, Richard M., Columbus, Ohio; Ohio State University College of Dentistry, 1918; died November 1; age 72.

Tofte, Hjalmar T., Janesville, Wis.; University of Minnesota School of Dentistry, 1942; died January 14; age 53.

Toler, Raymond W., Searcy, Ark.; Washing-

ton University School of Dentistry, 1911; died February 7; age 71.

Tornquist, Edwin W., Virginia, Minn.; Northwestern University Dental School, 1949; died January 10.

Torregrosa, Enrique A., Rio Piedras, Puerto Rico; Louisville College of Dentistry, 1914; died October 1; age 67.

Tower, Ray L., Salem, Ore.; Northwestern University Dental School, 1902; died November 8; age 81.

Trommald, Harold G., Portland, Ore.; North Pacific College of Oregon School of Dentistry, 1919; died November 22; age 69.

Trout, Henry C., Parkersburg, W. Va.; Ohio College of Dental Surgery, University of Cincinnati, 1915; died October 14; age 82.

Tuomy, Justin T., Bemidji Minn.; University of Michigan School of Dentistry, 1901; died October 30; age 85.

Turner, Everett C., Palm Beach, Fla.; North Pacific College of Oregon School of Dentistry, 1923; died January 26; age 62.

Turner, Frederick C., Danbury, Conn.; New York College of Dentistry, 1894; died January 2; age 88.

Ullom, Stanley W., Chicago; Northwestern University Dental School, 1911; died November 21; age 71.

Unger, Edward H., Greenwood, Ind.; Indiana University School of Dentistry, 1929; died November 4; age 52.

Vahue, Earl O., Fresno, Calif.; University of Illinois College of Dentistry, 1904; died October 21; age 79.

Van Buskirk, Guy, Bishop, Calif.; University of Southern California School of Dentistry, 1919; died February 13; age 75.

Vanrell, Louis A., Chicago; Chicago College of Dental Surgery, 1924; died September 16, 1960; age 65.

Van Tuyl, Harry I., Hinsdale, Ill.; Northwestern University Dental School, 1904; died October 8; age 91.

Vaughan, Charles H., Detroit; Northwestern University Dental School, 1912; died October 28; age 83.

Waddington, William H., Seattle; North Pacific College of Oregon School of Dentistry, 1912; died February 3; age 70.

Wagner, Herbert, Kew Gardens, N. Y.; New York University College of Dentistry, 1936; died October 10; age 48.

Walker, Tyler J., Saratoga, Calif.; North Pacific College of Oregon School of Dentistry, 1929; died February 7; age 54.

Ward, William M., Roanoke Rapids, N. C.; Baltimore College of Dental Surgery, 1918; died October 23; age 63.

Waters, John L., Vienna, Ga.; Atlanta-Southern Dental College, 1944; died September 18, 1960; age 38.

Waugh, Richard J., Pulaski, Va.; University of Pennsylvania School of Dentistry, 1918; died December 26; age 66.

Webster, Arthur G., Needham, Mass.; Harvard Dental School, 1906; died October 29; age 79.

Weller, Franklin B., Watkins Glen, N. Y.; University of Maryland, Dental Department, 1897; died December 17; age 86.

Westhoff, Henry F., St. Louis; Washington University School of Dentistry, 1914; died January 23; age 70.

Wheat, Mike C., Nixon, Texas; died January; age 86.

Wheeler, Robert B., Tucson, Ariz.; University of Iowa College of Dentistry, 1931; died October 2; age 63.

Wheeler, Tracy G., Des Moines, Iowa; University of Iowa College of Dentistry, 1912; died March 30; age 68.

White, Harry P., Sioux City, Iowa; Western Dental College, 1898; died October 24; age 87.

White, John T., Mobile, Ala.; Atlanta Dental College, 1912; died January 19; age 73.

White, Samuel W., Ormond Beach, Fla.; Temple University School of Dentistry, 1914; died December 1; age 70.

Whitson, Lee F., Arlington, Texas; Kansas City Dental College, 1918; died October 12; age 64.

Wiedeman, Ben A., Fort Worth, Texas; Texas Dental College, 1911; died September 8, 1960; age 71.

Wilk, Julian J., Adams, Mass.; Georgetown University School of Dentistry, 1953; died September 8, 1960; age 38.

Wilkins, Charles E., Tunica, Miss.; Louisville College of Dentistry, 1908; died September 8, 1960; age 82.

Willcox, Henry L., Rockford, Ill.; University of Illinois College of Dentistry, 1908; died December 15; age 74.

Williams, Harry N., Yellow Springs, Ohio; University of Minnesota School of Dentistry, 1921; died October 18; age 64.

Willis, William D., Richmond, Va.; University College of Medicine Dental Department, 1897; died November 20; age 88.

Wilson, Charles W., Detroit; University of Michigan School of Dentistry, 1922; died September 22, 1960; age 62.

Wilson, Clarence D., Oklahoma City; Kansas City Dental College, 1905; died October 3; age 75.

Wilson, Harry D., Portland, Ore.; North Pacific College of Oregon School of Dentistry, 1932; died December 23; age 53.

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announcements

MEETINGS OF THE AMERICAN DENTAL ASSOCIATION

One-Hundred and Second Annual Session	October 16-19, 1961	Philadelphia
One-Hundred and Third Annual Session	October 29-November 1, 1962	Miami Beach, Fla.
One-Hundred and Fourth Annual Session	October 14-17, 1963	Atlantic City, N.J.
One-Hundred and Fifth Annual Session	November 9-12, 1964	San Francisco
One-Hundred and Sixth Annual Session	November 8-11, 1965	Las Vegas, Nev.

MEETINGS OF CONSTITUENT SOCIETIES

State	*Date*	*Place*	*Secretary and Address*
Alabama	Apr. 14-18	Birmingham	C. R. Crook, Professional Center, Montgomery
Alaska	July 9-11	Fairbanks	G. O. Gould, Box 4-964, Spenard
Arizona	Apr. 25-28	Tucson	J. F. Vaughn, 2727 N. Central Ave., Phoenix
Arkansas	Apr. 8-11	Little Rock	D. M. Hamm, Box 89, Clarksville
California	Apr. 8-11	San Francisco	F. H. Romick, 518 Sutter St., San Francisco 2
S. California	Apr. 16-18	Los Angeles	C. D. Honig, 903 Crenshaw Blvd., Los Angeles 19
Colorado	Oct. 1-4	Colorado Springs	G. H. Siersma, 903 Republic Bldg., Denver 2
Connecticut	May 16, 17	Hartford	E. S. Arnold, 37 Linnard Rd., W. Hartford
Delaware	June 8, 9	Wilmington	R. Tomases, 2105 Washington St., Wilmington
Dist. of Columbia	Mar. 4-7	Washington	B. D. Mattox, 1835 Eye St., N.W., Washington 6
Florida	May 13-16	Miami Beach	L. J. Atkins, 223 Hyde Park Ave., Tampa
Georgia	Oct. 1-4	Atlanta	F. M. Butler, Jr., 307 Southern United Bldg., Macon
Hawaii	June 24-28	Honolulu	J. H. Dawe, 291 Alexander Young Bldg., Honolulu 13
Idaho			L. L. Nissen, 4th St. and Boulevard, Idaho Falls
Illinois	May 7-9	Springfield	P. W. Clopper, 632 Jefferson Bldg., Peoria
Indiana	May 20-23	Indianapolis	C. L. Howell, 1012 Hume Mansur Bldg., Indianapolis 4
Iowa	May 7-9	Des Moines	H. N. Hake, 639 Insurance Exchange Bldg., Des Moines 9
Kansas	May 6-9	Topeka	F. A. Richmond, Brotherhood Bldg., Kansas City 1
Kentucky	Apr. 1-4	Louisville	A. B. Coxwell, Jr., 2208 Dundee Rd., Louisville 5
Louisiana	May 9-12	Baton Rouge	J. S. Bernhard, 231 Atkins Ave., Shreveport 26
Maine	June 14-16	Rockland	S. M. Gower, 6 Coburn Ave., Skowhegan
Maryland	May 6-9	Baltimore	W. Schunick, 19 Medical Arts Bldg., Baltimore 1
Massachusetts	Apr. 29-May 2	Boston	H. E. Tingley, 227 Commonwealth Ave., Boston
Michigan	Apr. 9-11	Grand Rapids	K. J. Ryan, 901 Welch Blvd., Flint
Minnesota	Apr. 2-4	St. Paul	C. V. E. Cassel, 2236 Marshall Ave., St. Paul 4W
Mississippi	June 17-20	Biloxi	M. C. O'Keefe, Medical Arts Bldg., Jackson 2
Missouri	Apr. 22-25	St. Louis	E. D. Suggett, 101 W. High St., Jefferson City
Montana	May 3-5	Billings	R. C. Ritter, 28 N. Black St., Bozeman
Nebraska	Apr. 30-May 2	Omaha	F. A. Pierson, Federal Securities Bldg., Lincoln
Nevada	June 17-19	Lake Tahoe	O. M. Seifert, 821 Ryland Ave., Reno
New Hampshire	June 17-19	Whitefield	F. E. Williams, 517 Milton St., Manchester
New Jersey	May 20-23	Atlantic City	J. G. Carr, 407 Cooper St., Camden 2

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State	*Date*	*Place*	*Secretary and Address*
New Mexico	June 6-9	Santa Fe	E. P. Purtell, 2917 Santa Cruz Ave., S.E., Albuquerque
New York	May 6-10	Lake Kiamesha	C. A. Wilkie, 268 Ashland Pl., Brooklyn 17
North Carolina	May 6-9	Pinehurst	S. B. Towler, P.O. Box 11065, Raleigh
North Dakota			D. R. Perry, Box 866, Bismarck
Ohio	Nov. 5-8	Columbus	E. G. Jones, 185 E. State St., Columbus
Oklahoma	Apr. 8-11	Oklahoma City	W. C. Hopkins, 210 Plaza Court Bldg., Oklahoma City
Oregon	May 7-10	Portland	T. D. Holder, Selling Bldg., Portland
Panama C. Z.	May 26	Balboa	J. K. McDonald, P.O. Box 1417, Balboa
Pennsylvania	May 21-23	Wernersville	I. Sissman, 217 State St., Harrisburg
Puerto Rico	Oct. 21-23	San Juan	R. Gonzales R., Box 10452, Caparra Heights
Rhode Island	Jan. 14	Providence	E. Z. Radlo, 188 Main St., Pawtucket
South Carolina	June 3-6	Myrtle Beach	J. E. Wallace, 1506 Gregg St., Columbia
South Dakota	May 13-15	Yankton	R. E. Decker, 2909 Poplar Dr., Sioux Falls
Tennessee	May 6-10	Chattanooga	J. J. Vaughn, Jr., 210 23rd Ave., N., Nashville 5
Texas	Apr. 29-May 2	Dallas	C. A. McMurray, 3707 Gaston Ave., Dallas 10
Utah			R. C. Dalgleish, 1554 Princeton Ave., Salt Lake City
Vermont			E. C. Woods, 128 Merchants Row, Rutland
Virginia	Apr. 29-May 2	Richmond	M. E. Henderson, Shenandoah Bldg., Roanoke 11
Washington	June 24-28	Seattle	R. V. Tucker, 417 Grosvenor House, 500 Wall St., Seattle 1
West Virginia	July 29-Aug. 1	White Sulphur Springs	P. H. Loflin, 109½ E. Main St., Beckley
Wisconsin	Apr. 30-May 2	Milwaukee	C. J. Baumann, Jr., 704 W. Wisconsin Ave., Milwaukee
Wyoming	June	Worland	T. J. Drew, State Office Bldg., Cheyenne

MEETINGS OF STATE BOARDS OF DENTAL EXAMINERS

State	*Date*	*Place*	*Secretary and Address*
Alabama	June 24-30* June 25†	Birmingham	W. L. Smith, 524 Chestnut St., Gadsden
Alaska			J. E. Miller, 1000 Fireweed Lane, Anchorage
Arizona			R. K. Trueblood, 1611 N. Second Ave., Glendale
Arkansas	June 17-22*†	Little Rock	G. Cone, 113 S. Pecan St., Osceola
California			T. R. Flinn, 1021 O St., Rm. A-597, Sacramento 14
Colorado			J. E. Cummings, 903 Republic Bldg., Denver 2
Connecticut			M. J. Zazzaro, 99 Pratt St., Hartford 3
Delaware			J. F. Maguire, 1200 N. Van Buren St., Wilmington
Dist. of Columbia	Jan. 8-10	Washington	J. A. Madden, 1740 Massachusetts Ave., N.W., Washington 11
Florida			R. P. Taylor, Jr., P.O. Box 2913, Jacksonville 3
Georgia	June 4-6*†‡		T. A. Boone, 401 Southern United Bldg., Macon
Hawaii			R. M. Gibson, Alexander Young Bldg., Honolulu
Idaho			W. M. Smith, 305 Fort St., Boise
Illinois			R. I. Humphrey, 185 N. Wabash Ave., Chicago
Indiana	Nov. 13-16*†	Indianapolis	C. A. Frech, Gary National Bank Bldg., Gary
Iowa	June 4-7*‡ June 4, 6†‡		P. A. Hahn, Farmers & Merchants Bank Bldg., Burlington
Kansas	Jan. 22-24 June 4-6	Kansas City, Mo.	E. F. Cavin, 119 W. Eighth, La Crosse
Kentucky			F. W. Jordan, 2208 Dundee Rd., Louisville
Louisiana			A. R. deNux, 617 N. Monroe St., Marksville
Maine			A. H. Garcelon, 133 State St., Augusta
Maryland	Nov. 6-8	Baltimore	F. J. Bryce, 303 Granville Dr., Silver Spring
Massachusetts			R. R. Racicot, 33 State House, Boston
Michigan	June 21-27*† June 10-16*†	Ann Arbor	J. L. Champagne, 3714 W. McNichols Rd., Detroit 21
Minnesota			E. A. Nelson, 2236 Marshall Ave., St. Paul 4W
Mississippi			C. V. Pettey, Jr., Box 387, Magnolia

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3. Shades are consistent from batch to batch. No matter when Dura-Blend teeth were made, they will match your Dura-Blend shade guide.
4. The shade match you secure at the chair will remain a match in any light: daylight, fluorescent, or incandescent.

Dura-Blend shade guide matches natural teeth three times as often as the nearest competitive shade guide.

Dura-Blend teeth provide the greatest consistency to their own shade guide.

5. Dura-Blend shade guides are consistent with each other. Your shade guide will match your laboratory's shade guide.
6. Dura-Blend resin teeth match Myerson's porcelain teeth so well that you can use any desired combination.

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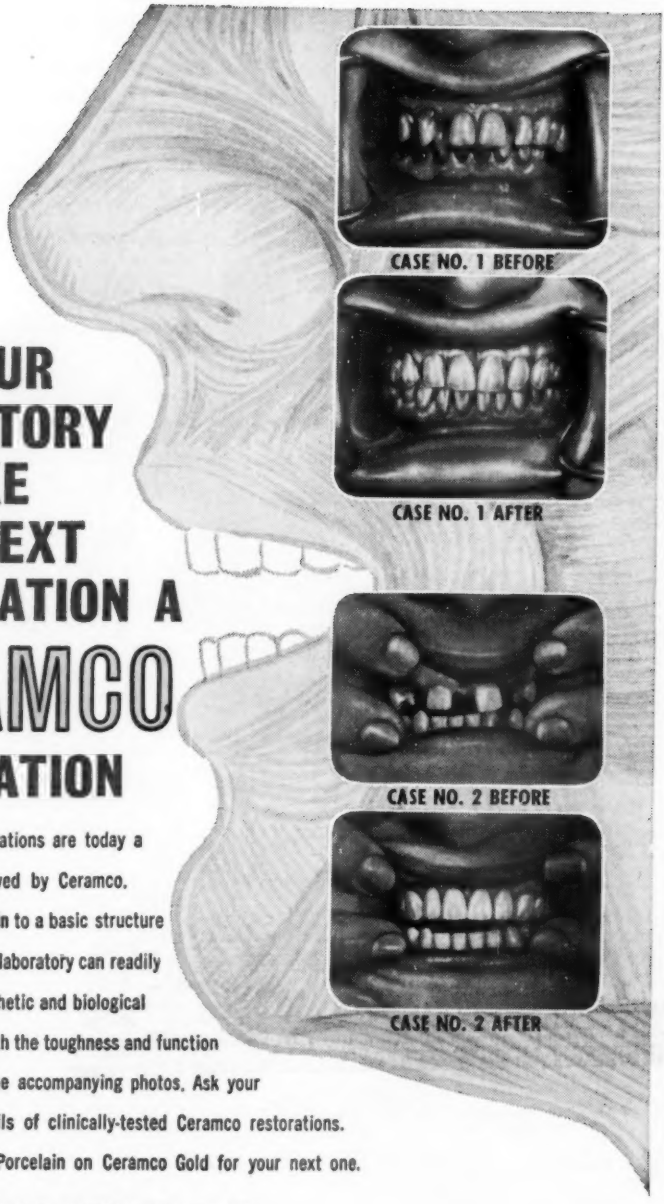
State	Date	Place	Secretary and Address
Missouri	Oct. 26-28* Oct. 30, 31* Oct. 26, 30, 31†	St. Louis	R. R. Rhoades, Central Trust Bldg., Jefferson City
Montana			E. A. Cogley, Medical Arts Bldg., Great Falls
Nebraska			H. E. Weber, Stuart Bldg., Lincoln
Nevada	Dec. 11	Las Vegas	R. Whitehead, P. O. Box 1547, Reno
New Hampshire			L. U. Bergeron, 211 High St., Somersworth
New Jersey	Nov. 27, 28* Nov. 29* Nov. 28†	Philadelphia Trenton Philadelphia	C. J. Schweikhardt, 150 E. State St., Trenton 8
New Mexico			G. D. Hastain, Box 1007, Clovis
New York	Nov. 30, Dec. 1 Dec. 5-8	New York Buffalo New York Albany Syracuse Buffalo	D. F. Wallace, University of the State of New York, State Education Department, Division of Professional Education, Albany 1
North Carolina			J. H. Guion, Doctors Bldg., Charlotte 7
North Dakota	July 9-13	Fargo	R. L. Bork, Williston
Ohio			D. E. Bowers, 322 E. State St., Columbus 15
Oklahoma			W. H. Stephens, Plaza Court Bldg., Oklahoma City
Oregon			C. Wheeler, Medical Arts Bldg., Portland
Pennsylvania	Dec. 6, 7* Dec. 6†	Philadelphia	P. Swanson, 8111 Jenkins Arcade, Pittsburgh
Puerto Rico			J. Mercado C., Comercio St., #452, San Juan
Rhode Island			A. E. Turcone, 298 Broadway, Providence
South Carolina			W. J. Brockington, 2827 Millwood Ave., Columbia 1
South Dakota			W. P. Powell, Box 409, Vermillion
Tennessee	Dec. 13-16	Memphis	C. R. Aita, Bennie-Dillon Bldg., Nashville
Texas			R. T. Weber, Capital National Bank Bldg., Austin 16
Utah			M. O. Hutchins, 230 E. Tabernacle, St. George
Vermont			B. S. Pinney, 215 Pearl St., Burlington
Virginia	June 11-16* June 13, 14†	Richmond	J. M. Hughes, Medical Arts Bldg., Richmond
Washington	Jan. 15-18‡		G. J. Chatalas, Stimson Bldg., Seattle
West Virginia	June 18-20* June 19, 20†	Morgantown	A. B. Drake, 1355 Fourth Ave., Huntington
Wisconsin	Jan. 8-11‡ June 4-7‡		A. H. Clark, 794 N. Jefferson St., Milwaukee 2
Wyoming			W. J. Ryan, Boyd Bldg., Cheyenne

**Dental examination. †Dental hygiene examination. ‡Write to secretary of dental examining board for information on locations of examinations. ††Hygienist examination at any time.*
Most states require applications to be in 30 days prior to examination date.

NATIONAL EXAMINATIONS

Name	Date	Place	Secretary and Address
American Board of Dental Public Health	Oct. 12, 13	Philadelphia	D. J. Galagan, Divn. of Dental Public Health, PHS, Dept. of Health, Education and Welfare, Washington, D.C.
American Board of Oral Pathology	Dec. 9, 10		W. G. Shafer, Indiana University, School of Dentistry, 1121 W. Michigan St., Indianapolis 2
American Board of Oral Surgery	Dec. 4 Mar. 24-27	Chicago	L. M. FitzGerald, Roshek Bldg., Dubuque, Iowa
American Board of Orthodontics	Apr. 23-28	Los Angeles	A. W. Moore, University of Washington, School of Dentistry, Seattle 5
American Board of Pedodontics	Oct. 30-Nov. 2	Ann Arbor, Mich.	R. L. Ireland, College of Dentistry, University of Nebraska, Lincoln 8, Neb.
American Board of Periodontology			B. O. A. Thomas, 668 Homer Ave., Palo Alto, Calif.
American Board of Prosthodontics			C. H. Jamieson, David Whitney Bldg., Detroit 26
Council on Dental Education, Dental Aptitude Tests	Oct. 6, 7 Jan. 5, 6 Apr. 27, 28		B. F. Miller III, Acting Secretary, 222 E. Superior St., Chicago 11
National Board of Dental Examiners	Dec. 4, 5		Grace Parkin, 222 East Superior St., Chicago 11



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MEETINGS OF OTHER ORGANIZATIONS

Name	*Date*	*Place*	*Secretary or Chairman and Address*
Academy of General Dentistry	Oct. 16-19	Philadelphia	A. L. Knab, 8500 Stony Island Ave., Chicago 17
Academy of Oral Dynamics	Oct. 15 Dec. 3		J. T. McSweeney, 140 E. 80th St., New York 21
American Academy of Dental Medicine	Dec. 3	New York	G. F. Clarke, 554 Franklin St., Melrose 76, Mass.
American Academy of Gold Foil Operators	Oct. 11-13	Philadelphia	C. C. Latham, P.O. Box 266, Coronado, Calif.
American Academy of the History of Dentistry	Oct. 13	Philadelphia	M. B. Asbell, 25 Haddon Ave., Camden, N.J.
American Academy of Implant Dentures	Oct. 12-15	Philadelphia	A. N. Cranin, 2120 Ocean Ave., Brooklyn 29
American Academy of Maxillofacial Prosthetics	Oct. 11-13	Philadelphia	M. C. Cleaver, 2330 Linwood Ave., Coytesville, Fort Lee, N.J.
American Academy of Oral Roentgenology	Oct. 14, 15	Philadelphia	T. S. Grant, University of California Medical Center, San Francisco 22
American Academy of Periodontology	Oct. 20-25	Bermuda Cruise	C. E. Chamberlain, 1101 N. North St., Peoria, Ill.
American Academy of Restorative Dentistry	Feb. 17, 18	Chicago	W. Branstad, Lowry Medical Arts Bldg., St. Paul 2
American Association of Dental Editors	Oct. 14	Philadelphia	E. M. Ebert, 10058 Ewing Ave., Chicago
American Association of Dental Examiners	Oct. 13, 14	Philadelphia	C. J. Schweikhardt, 20 Durand Rd., Maplewood, N.J.
American Association of Dental Schools	Mar. 18-21	St. Louis	R. Sullens, 840 N. Lake Shore Dr., Chicago 11
American Association of Endodontists	Feb. 11-14	Miami Beach, Fla.	R. A. Uchin, 1040 Bayview Dr., Ft. Lauderdale, Fla.
American Association of Public Health Dentists	Oct. 14	Philadelphia	A. H. Trithart, Montana State Board of Health, Helena
American College of Dentists	Oct. 14, 15	Philadelphia	O. W. Brandhorst, 4236 Lindell Blvd., St. Louis
American Dental Assistants Association	Oct. 16-19	Philadelphia	Mrs. E. Troutman, First National Bank Bldg., La Porte, Ind.
American Dental Hygienists' Association	Oct. 16-19	Philadelphia	M. E. Swanson, 100 E. Ohio St., Chicago 11
American Dental Society of Anesthesiology	Oct. 13-15	New York	H. A. Sultz, 1275 Delaware Ave., Buffalo 9
American Denture Society	Oct. 13, 14	Philadelphia	V. L. Steffel, 19 W. Fifth Ave., Columbus, Ohio
American Institute of Oral Biology	Nov. 6-10	Palm Springs, Calif.	M. L. Meyer, 2240 Channing Way, Berkeley 4, Calif.
American Psychosomatic Society	Mar. 30-Apr. 1	Rochester, N.Y.	S. Wolf, 265 Nassau Rd., Roosevelt, N.Y.
American Public Health Association, Dental Health Section	Nov. 13-17	Detroit	D. F. Striffler, New Mexico Dept. of Public Health, 408 Galisteo St., Santa Fe
American Society for the Advancement of General Anesthesia in Dentistry	Oct. 23	New York	M. Balaban, 161 W. 54th St., New York
American Society of Dentistry for Children	Oct. 13-15	Philadelphia	W. O. Young, 120 N. Capitol Blvd., Boise, Idaho
American Society of Oral Surgeons	Oct. 7-13	Bermuda Cruise	D. C. Trexler, 840 N. Lake Shore Dr., Chicago 11
Armed Forces Dental Officers Association	Oct. 15, 16	Philadelphia	W. Z. Kling, Medical Arts Bldg., San Antonio, Texas
Association of American Women Dentists	Oct. 16	Philadelphia	J. Palancia, 1527 W. Passyunk Ave., Philadelphia

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Name	*Date*	*Place*	*Secretary or Chairman and Address*
Austrian Dental Society, Centennial Jubilee Congress	Nov. 14-18	Vienna	S. Loos, Weihburggasse 10-12, Vienna 1, Austria
Central America and Panama Dental Federation (Fifth Congress)	Jan. 21-26	Panama	A. H. Berguido, Apartado 4115, Panama, Republic of Panama
Chicago Dental Society	Feb. 18-21	Chicago	K. S. Richardson, 30 N. Michigan Ave., Chicago
Congrès de L'Entente Odontologique	Nov. 20-26	Paris, France	J. L. Dephilippe, 39 Blvd. Malesherbes, Paris 8e, France
Denver Dental Association Midwinter Meeting	Jan. 7-10	Denver	G. L. Ogle, Republic Bldg., Denver 2
Fédération Dentaire Internationale, (50th Annual Session)	July 7-14	Cologne, Germany	G. H. Leatherman, 35 Devonshire Pl., London W.1, England U.S.A. Section, O. H. Moen, 6 Main St., Watertown, Wis.
Greater New York Dental Meeting (Thirty-seventh)	Dec. 4-8	New York	Mrs. M. Purdy, 106-A Hotel Statler Hilton, New York 1
International Academy of Orthodontics	Nov. 3	Los Angeles	M. Schleimer, 5828 N. Adenmoor Ave., Lakewood Calif.
International Association for Dental Research	Mar. 15-18	St. Louis	J. C. Muhler, Indiana University Dental School, 1121 W. Michigan St., Indianapolis
International Dental Congress (Thirteenth)	July 7-14	Cologne, Germany	G. H. Leatherman, 35 Devonshire Pl., London W.1, England U.S.A. Section, O. H. Moen, 6 Main St., Watertown, Wis.
International Dental Congress of Uruguay-Argentina	Nov. 12-19	Montevideo, Uruguay	J. C. Turell, Av. Agraciada 1464 (P. 13), Montevideo, Uruguay
International College of Dentists	Oct. 14, 15	Philadelphia	H. O. Westerdahl, 4829 Minnetonka Blvd., Minneapolis 16
Italian Medical Dental Association, (35th Congress)	Dec. 8-12	Milan	P. Lalli, Via Bonifacio VIII, 22, Rome, Italy
Mexican Dental Association (Sixth biennial)	Nov. 19-23	Mexico City	C. J. Cornish, Sinaloa No. 9, Mexico 7, D.F.
Mid-Continent Dental Congress	Oct. 29-Nov. 1	St. Louis	J. E. Brophy, 8013 Maryland Ave., St. Louis 5
Midwest Society of Periodontology	Feb. 18	Chicago	L. Howlett, Jr., Medical Arts Bldg., Springfield, Mo.
National Association of Seventh-Day Adventist Dentists	Oct. 12-14	Philadelphia	E. M. Collins, College of Medical Evangelists, School of Dentistry, Loma Linda, Calif.
New England Dental Society	Nov. 1, 2	Boston	W. F. O'Meara, 904 Main St., Hartford, Conn.
New Orleans Dental Conference	Nov. 4-6	New Orleans	J. R. Bond, Maison Blanche Bldg., New Orleans
Northeastern Society of Orthodontists	Oct. 29-31	Rochester, N.Y.	D. Mossberg, 36 Central Park S., New York 19
Northeastern Society of Periodontists	Nov. 3	New York	I. W. Scopp, V.A. Hospital, First Ave. at E. 24th St., New York 10
Odontological Society of Western Pennsylvania	Oct. 31, Nov. 1	Pittsburgh	H. D. Butts, Jr., Jenkins Bldg., Pittsburgh 22
Peru National Dental Congress (Fifth) and First International Congress of Stomatology	Nov. 5-11	Lima	G. Roose C., Av. Pershing 155, San Isidro, Lima, Peru
Southern Academy of Oral Surgery	Mar. 25, 26	Atlanta, Ga.	T. E. Braly, Jr., Volunteer Bldg., Chattanooga, Tenn.
Thomas P. Hinman Dental Meeting, (Semi-centennial celebration)	Mar. 25-28	Atlanta, Ga.	N. Blass, 727 W. Peachtree St., N.E., Atlanta 8, Ga.
Women's Auxiliary to the American Dental Association	Oct. 16-19	Philadelphia	Mrs. G. G. Smith, 212 S. Third St., Kaysville, Utah

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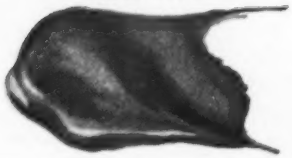

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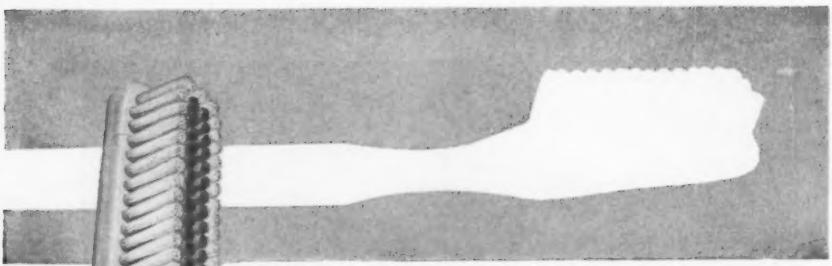

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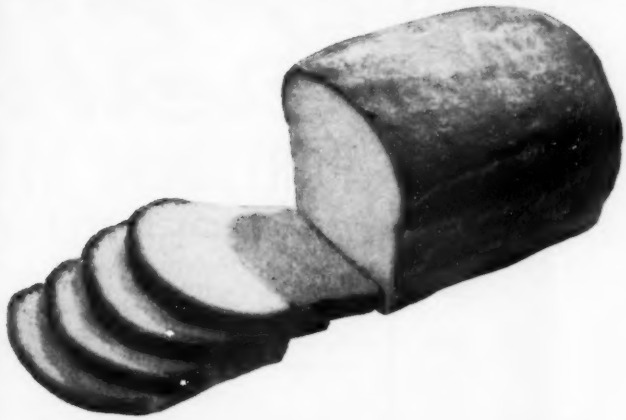

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1 each FG Carbide Burs Nos. 4, 14, 37, 57, 556, 558, 700, 701
2 each FG Carbide Burs Nos. ½, 1, 2, 33½, 34, 35, 37L, 170, 170L, 171, 557, 558L, 701L, 1558
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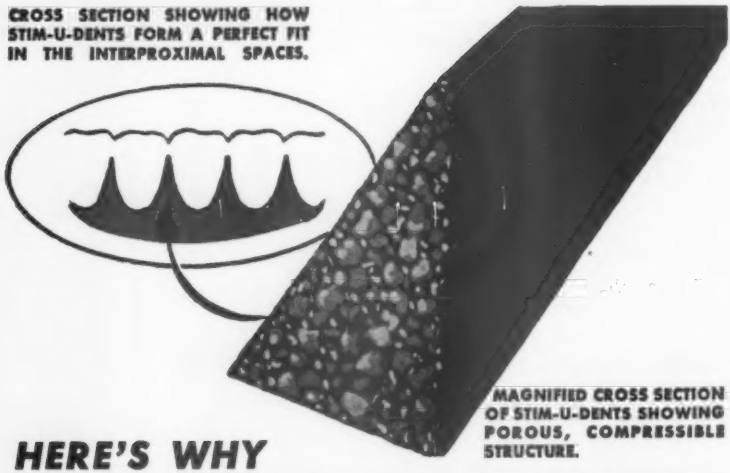

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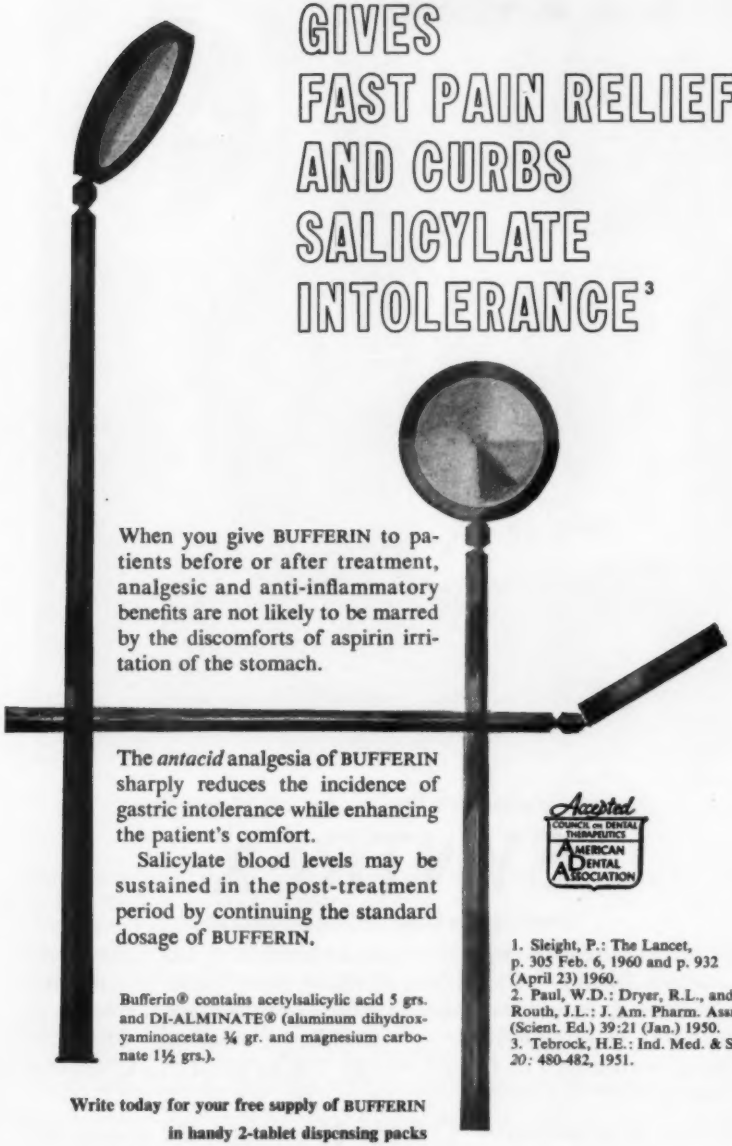

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1. Sleight, P.: The Lancet, p. 305 Feb. 6, 1960 and p. 932 (April 23) 1960.
2. Paul, W.D.: Dryer, R.L., and Routh, J.L.: J. Am. Pharm. Assn. (Scient. Ed.) 39:21 (Jan.) 1950.
3. Tebrock, H.E.: Ind. Med. & Surg. *20:* 480-482, 1951.

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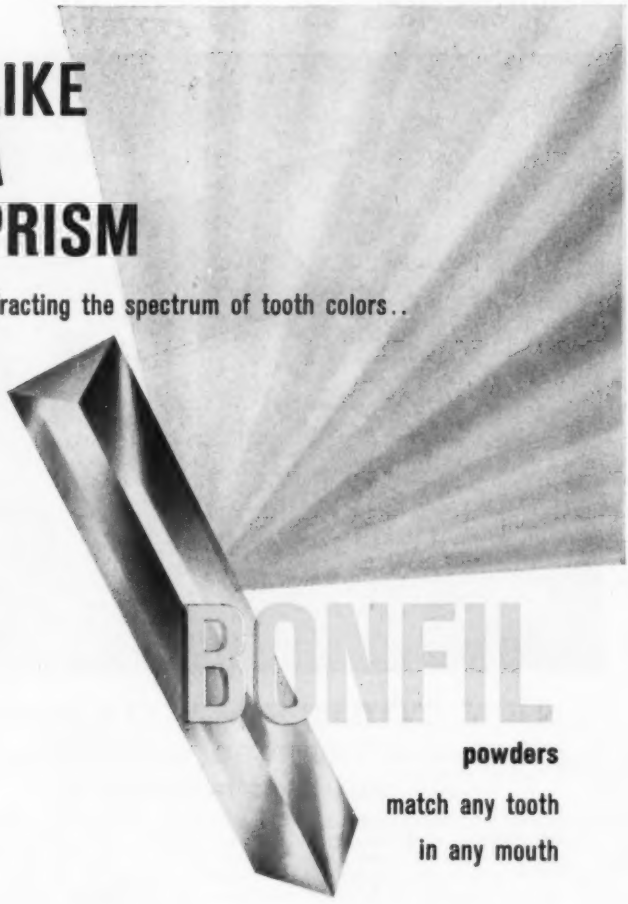

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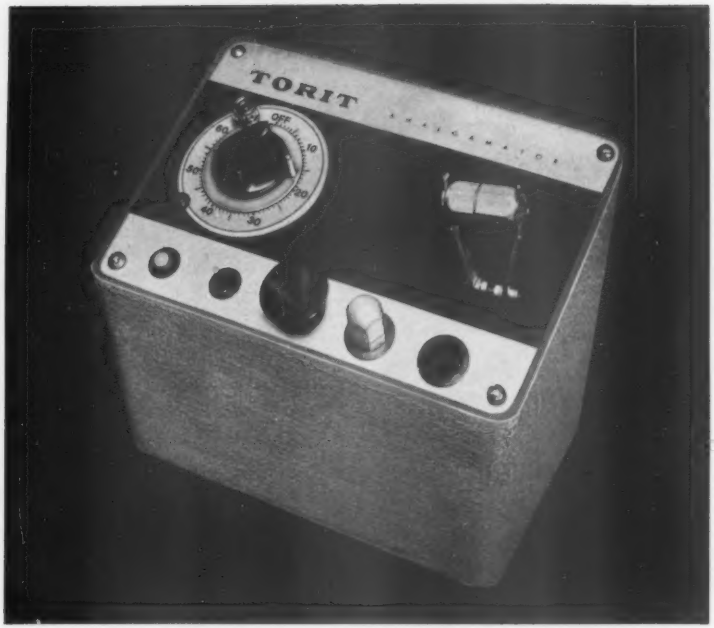

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July, 1962—(1) *Caries;* Erling Johansen, Consulting Editor. (2) *Transplantation and Regeneration of Tissue;* Max Shapiro, Consulting Editor.

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1.) Arnold, F. A. Jr., McClure, F. J. and White, C. L.: Dental Progress 1:3-12 (October) 1960.
2.) Muhler, J. C.: J.A.D.A. 61:431 (October) 1960.

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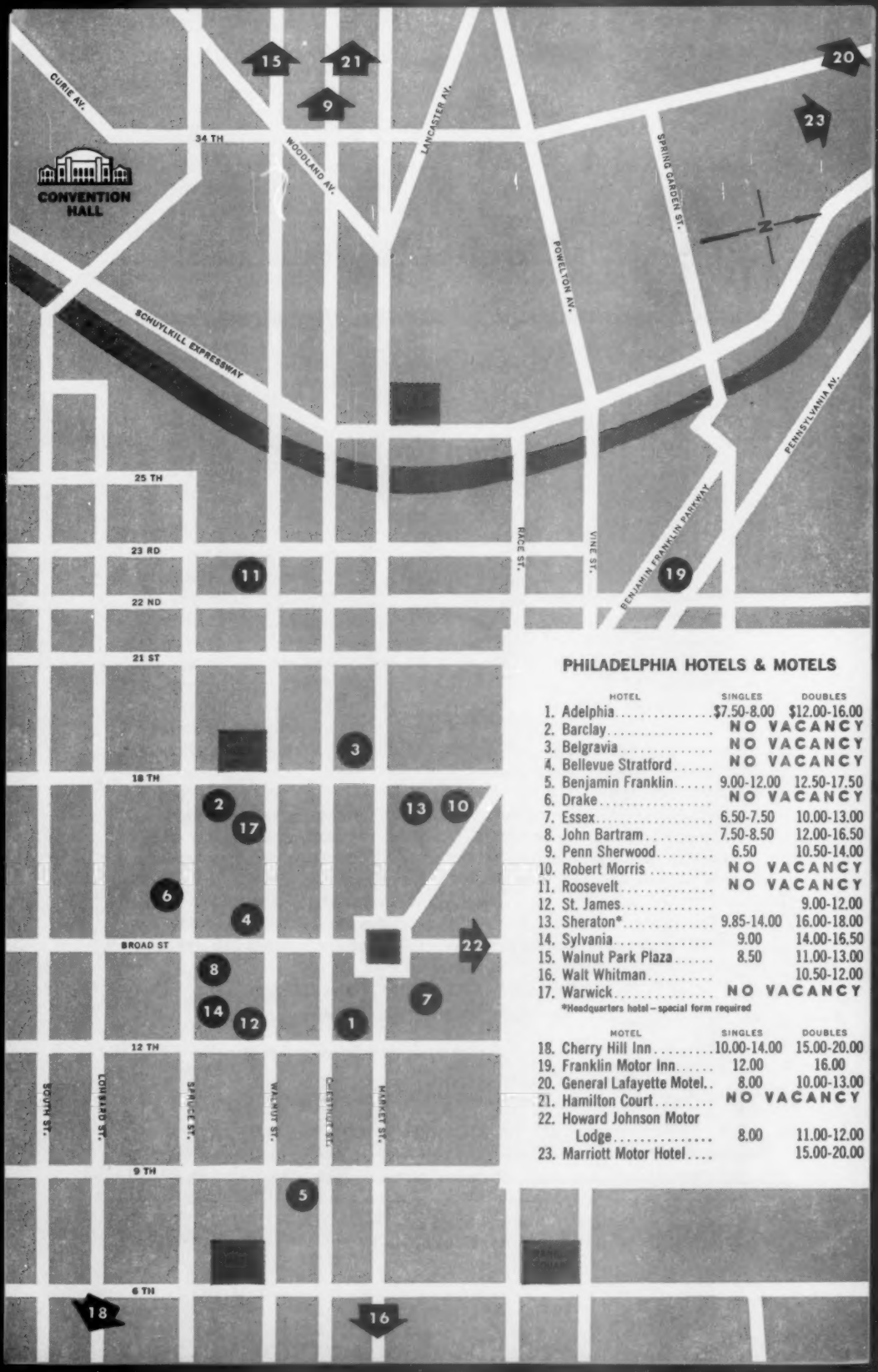

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References: 1. Berling, C. Carbocaine in local anaesthesia in the oral cavity. Odont. Revy. 9:254 1958. 2. Feldmann, G., and Nordenram, A. The anaesthetic effect of Carbocaine and lidocaine. Svenska Tandl.-Tidskr. 52:531 1959. 3. Weil, C., Welham, F. S., Santangelo, C. and Yackel, R. F. Clinical evaluation of mepivacaine hydrochloride by a new method. J.A.D.A. 63:26 July 1961. 4. Dobbs, E. C., and Ross, N. The new

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local anesthetic, Carbocaine. New York State D.J. (to be published). 5. Wessman, T. A private practitioner's view of a local anesthetic without a vasoconstrictor. Sverig. Tandläk.-Forb. Tidn. No. 3 1959. 6. Schwarzkopf, H. A further advance within the field of odontological local anesthesia. Deutsche Zahnärztebl. No. 24 1959. 7. Ross, N., and Dobbs, E. C. A preliminary study on Carbocaine. J.A.D.S.A. 7:4 Nov. 1960.

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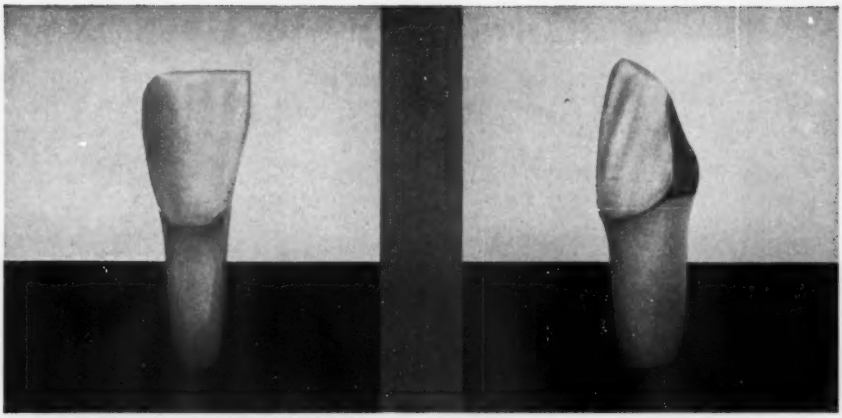

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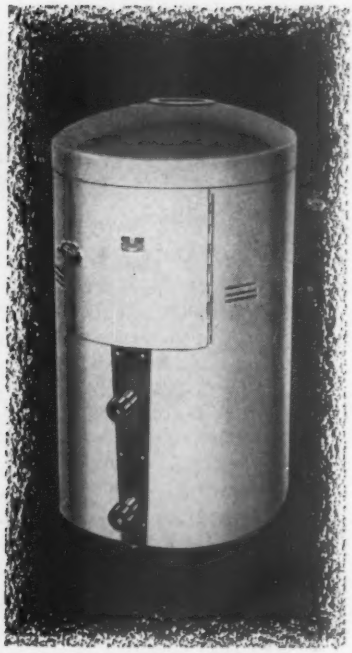

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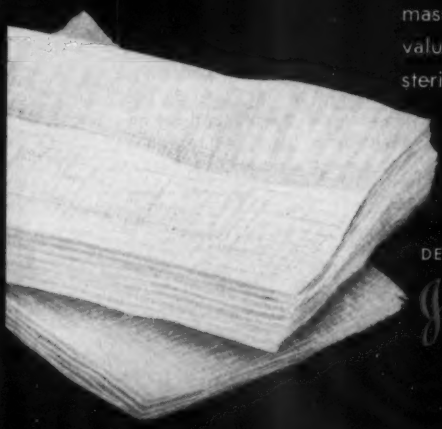

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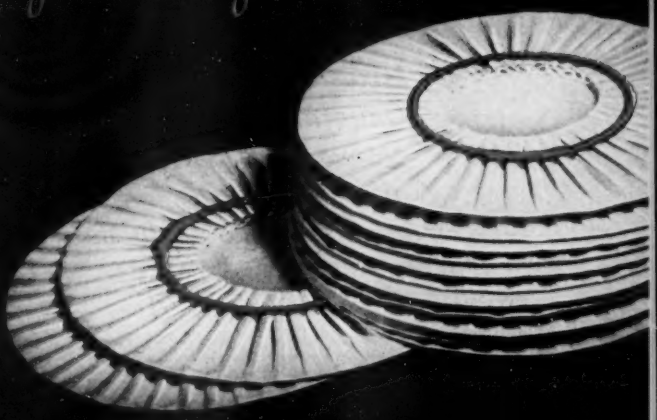

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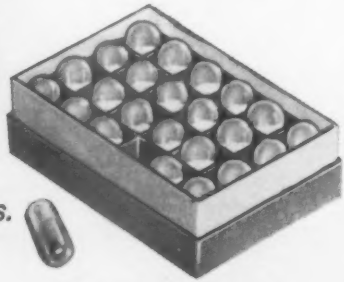

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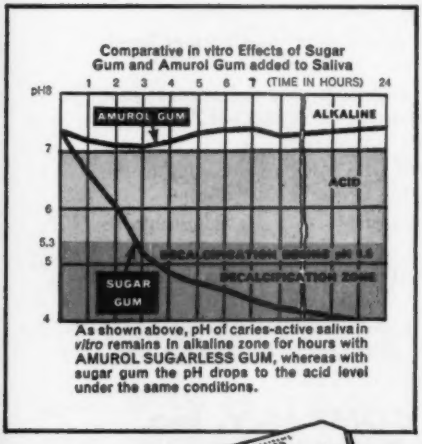
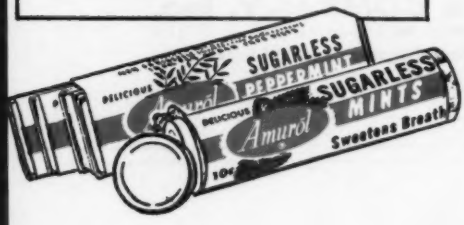


As shown above, pH of caries-active saliva in *vitro* remains in alkaline zone for hours with AMUROL SUGARLESS GUM, whereas with sugar gum the pH drops to the acid level under the same conditions.



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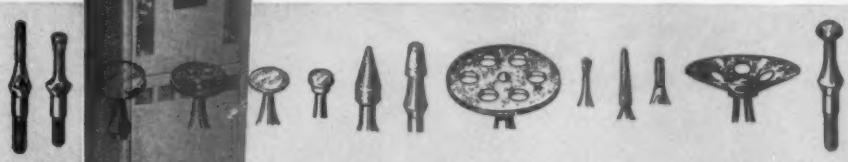

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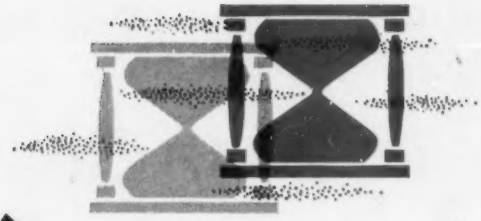

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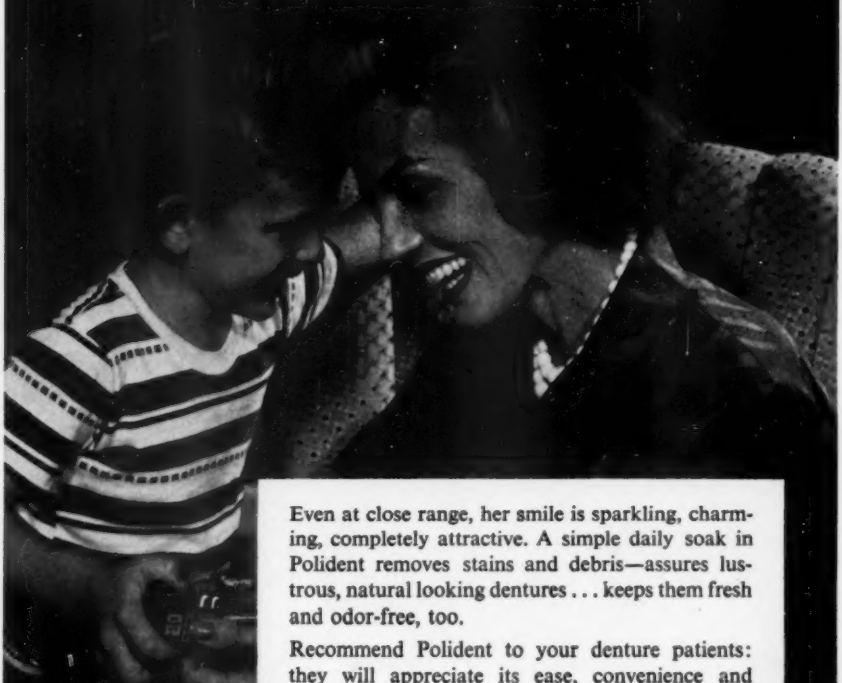

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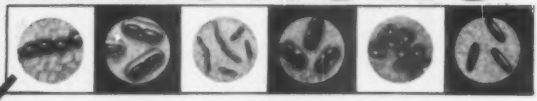

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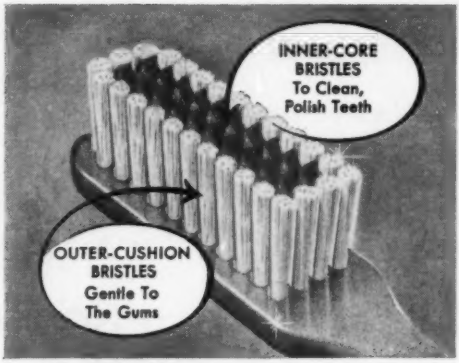

DESIGNED TO CLEAN TEETH CLEANER, BE GENTLE TO THE GUMS

Look at the core of this new Colgate Toothbrush! Short, tough, tapered bristles to clean and polish teeth—brush away film and stain. The outer-cushion bristles are longer and softer—designed to remove hidden food specks and be gentle to the gums.

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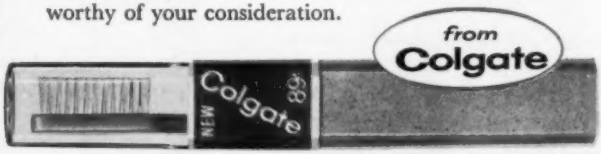

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Sizes: ½" to ⅞" diameter, 1/16" and ⅛" thick
Packed 25, 50 and 100 of one size, 50 and 100 assorted

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1. Use medium grit wheel to obtain satin finish
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No polishing agent required—restores original glaze to enamel and to porcelain teeth

Sizes: ⅝" diameter, 1/16" and ⅛" thick
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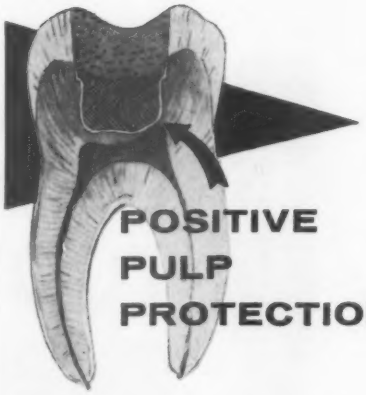

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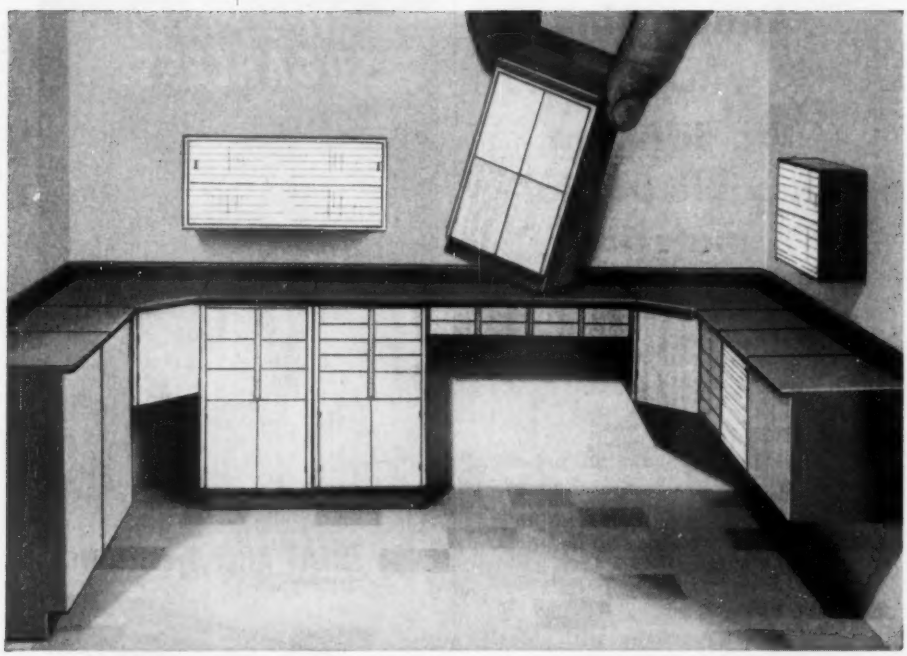

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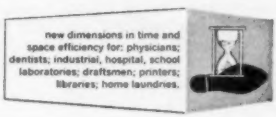
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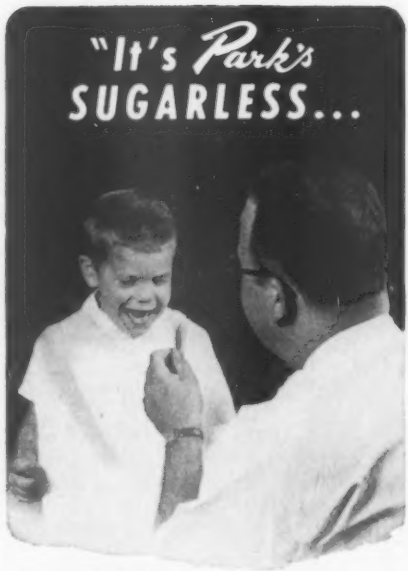

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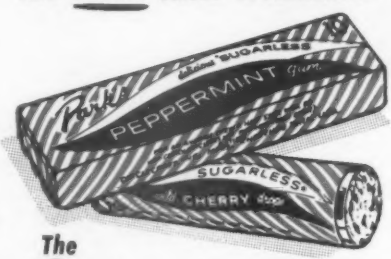

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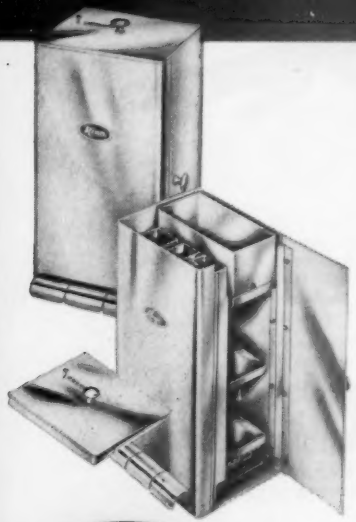

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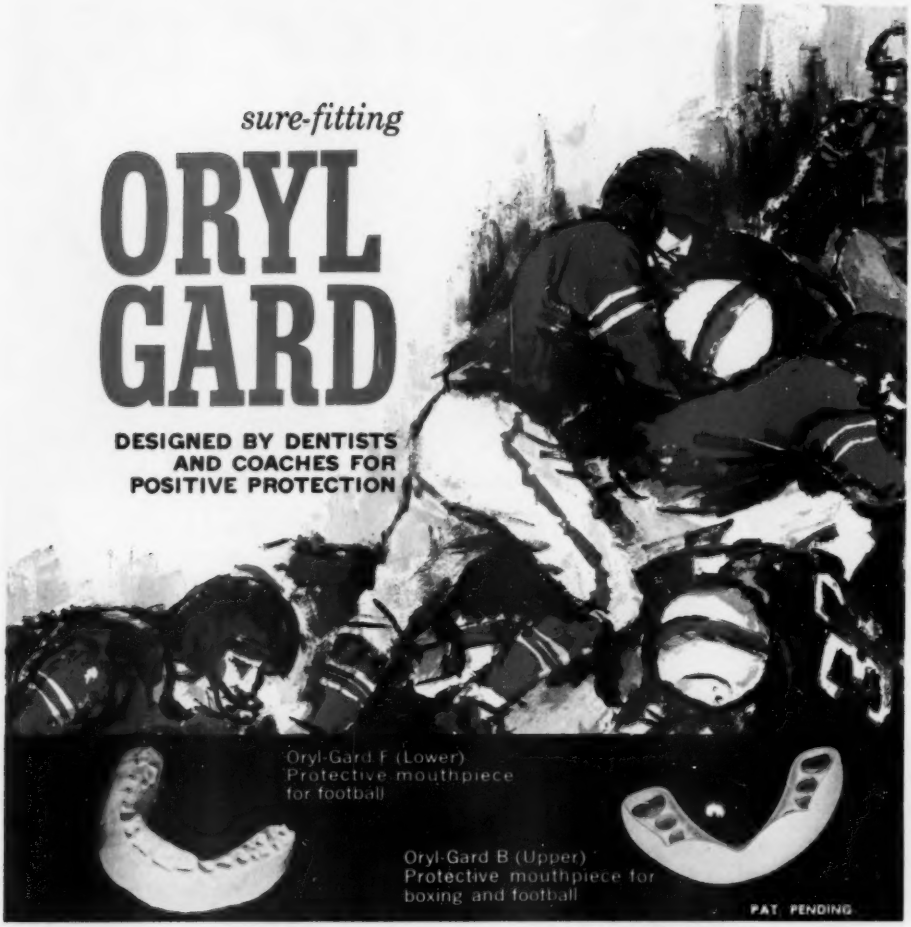

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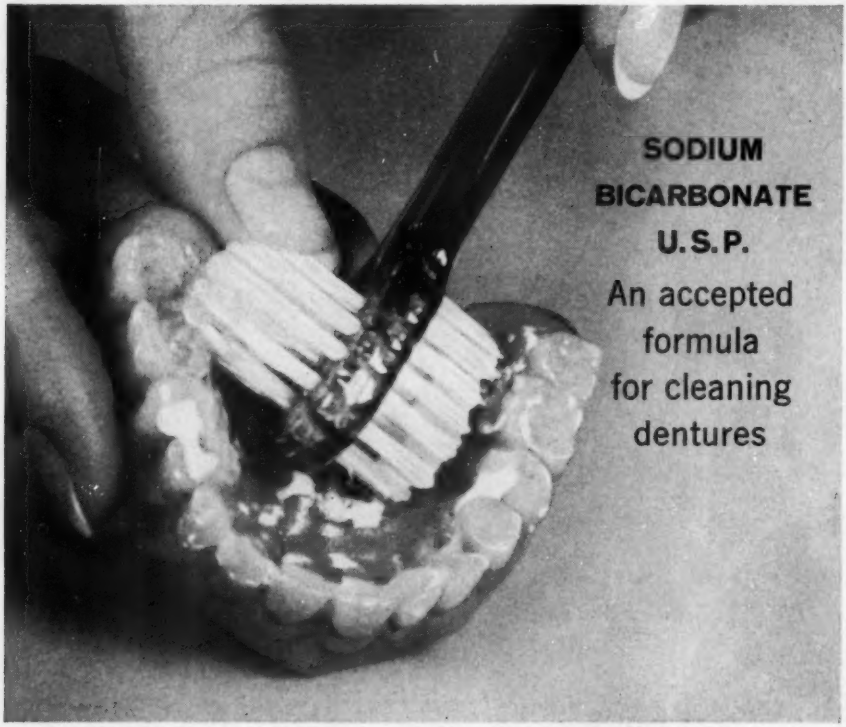

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1. Accepted Dental Remedies, 26th ed., American Dental Association, 1961, p. 180.

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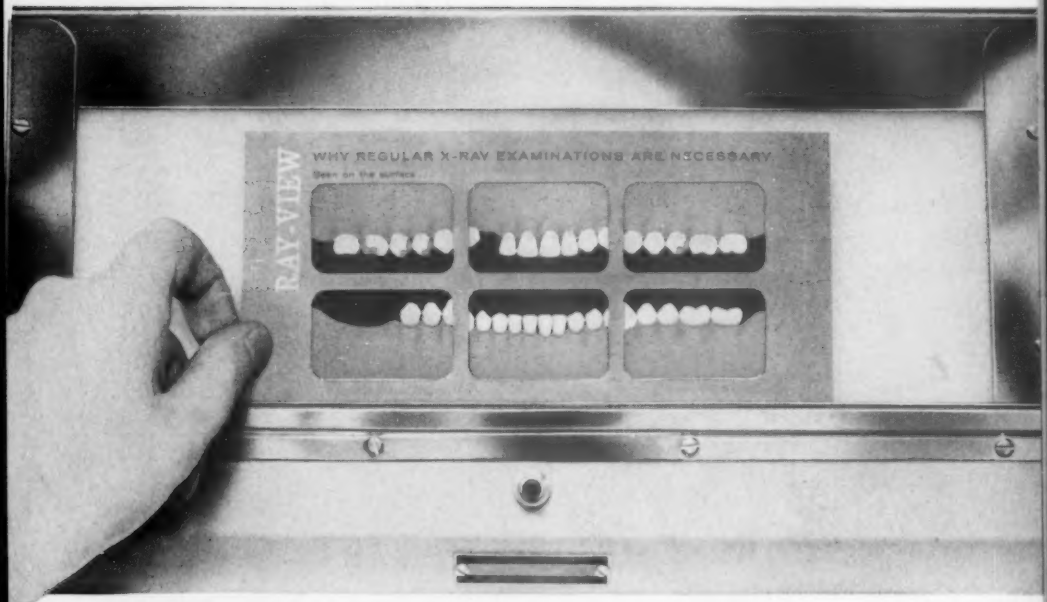
. . . free to the profession, on request



Place the RAY-VIEW card on your radiograph viewer with the LIGHT OFF . . . your patient sees a mouth with no apparent pathology.

"When a patient raises a vague objection to radiographs, it usually can be traced to ignorance and confusion," a Midwestern dentist told us. "Of course we can simply insist on x-ray pictures," he said, "but once a patient learns the benefits of radiographs, I get genuine cooperation, and a much stronger dentist-patient relationship." Professional attitudes like this led to the development of the Ray-View, a quick, memorable way to explain the need for radiographs.

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f ideas gathered from various sources by the Professional Services Division of Procter & Gamble . . .

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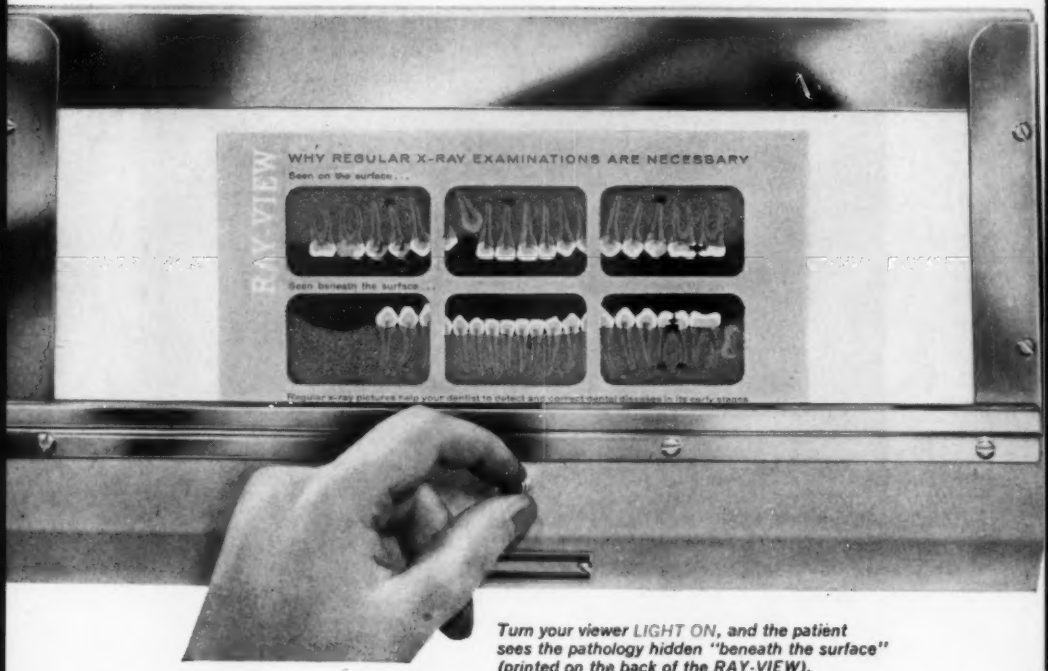
RAY-VIEW
WHY REGULAR X-RAY EXAMINATIONS ARE NECESSARY
Seen on the surface...
Seen beneath the surface...
Regular x-ray pictures help your dentist to detect and correct dental diseases in its early stages

Turn your viewer LIGHT ON, and the patient sees the pathology hidden "beneath the surface" (printed on the back of the RAY-VIEW).

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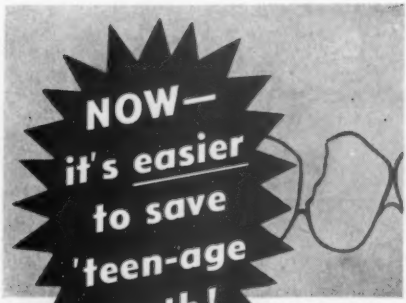

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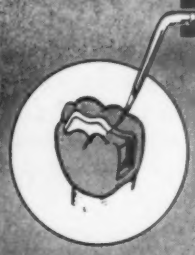

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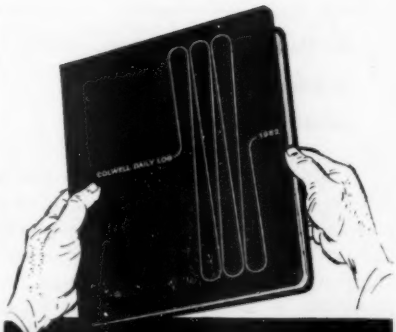

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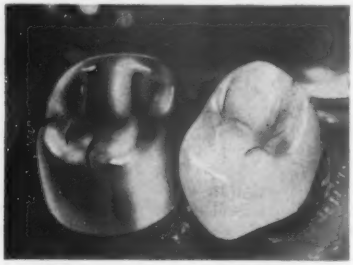

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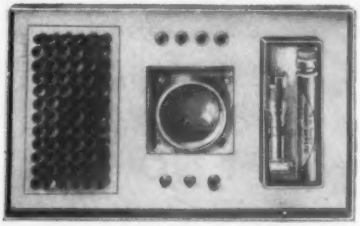

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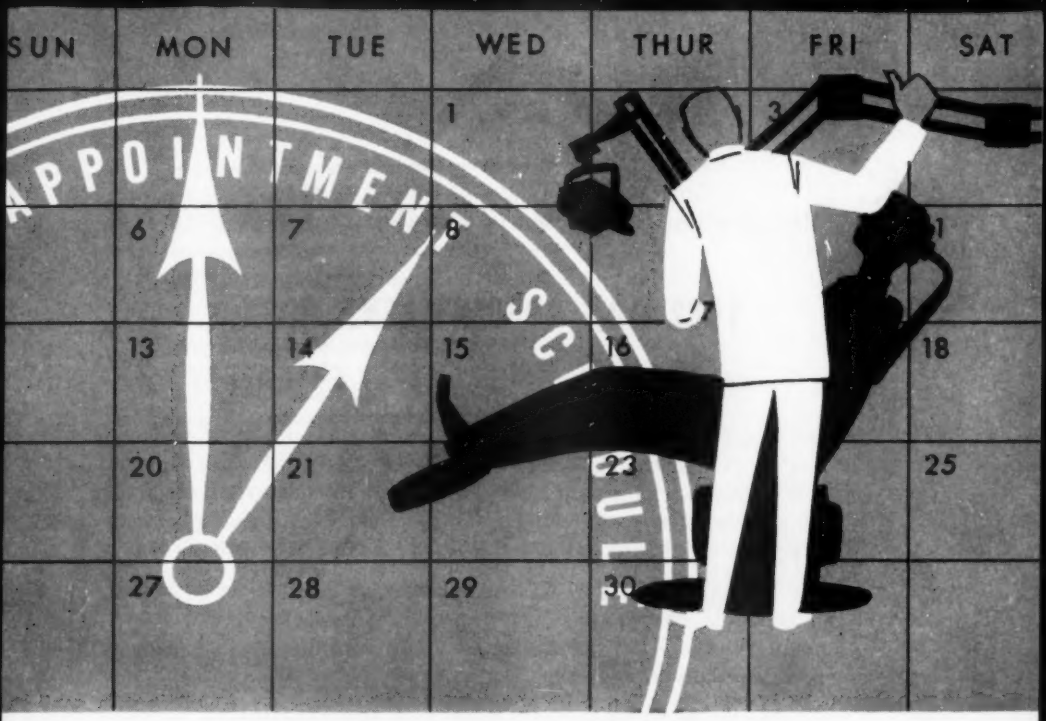

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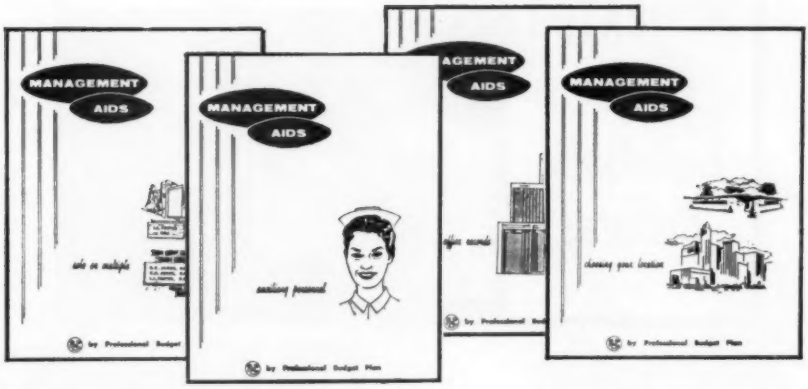

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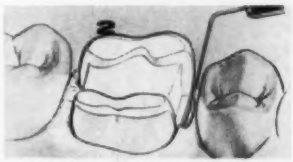

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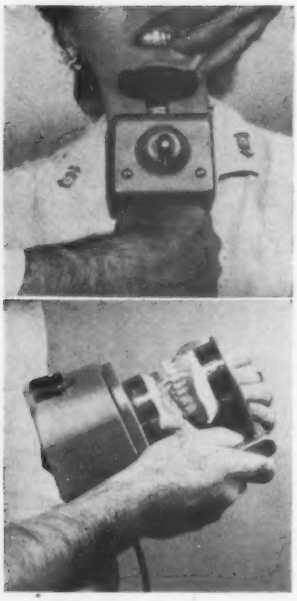

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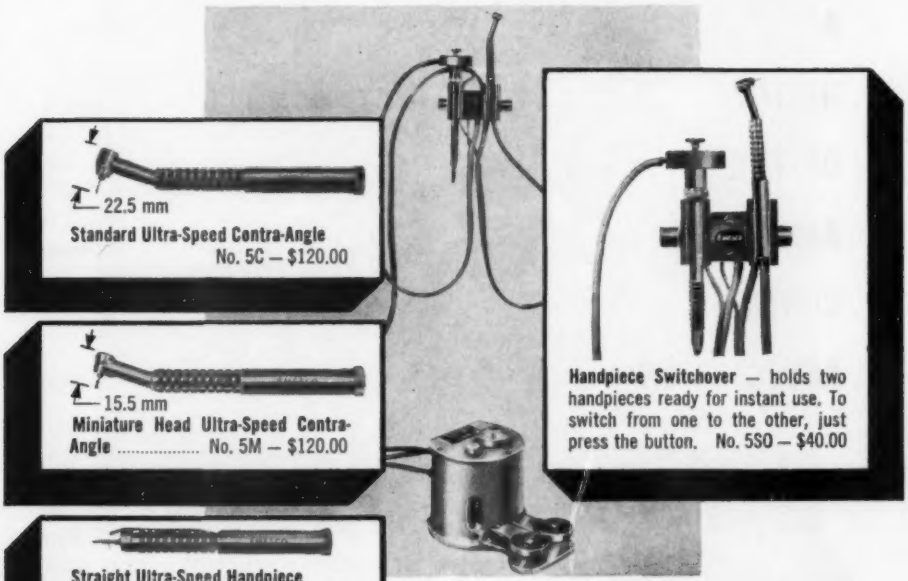

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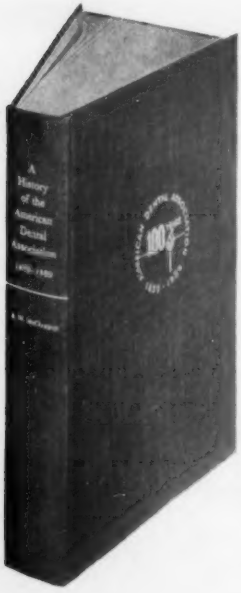

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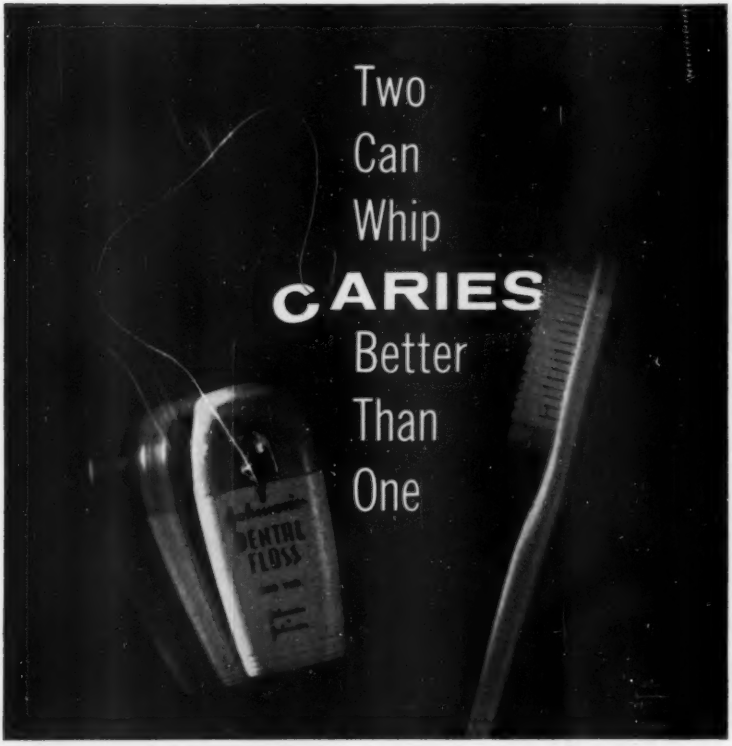

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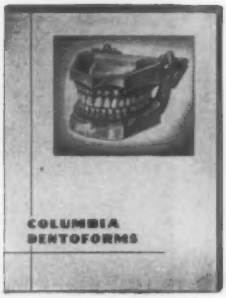

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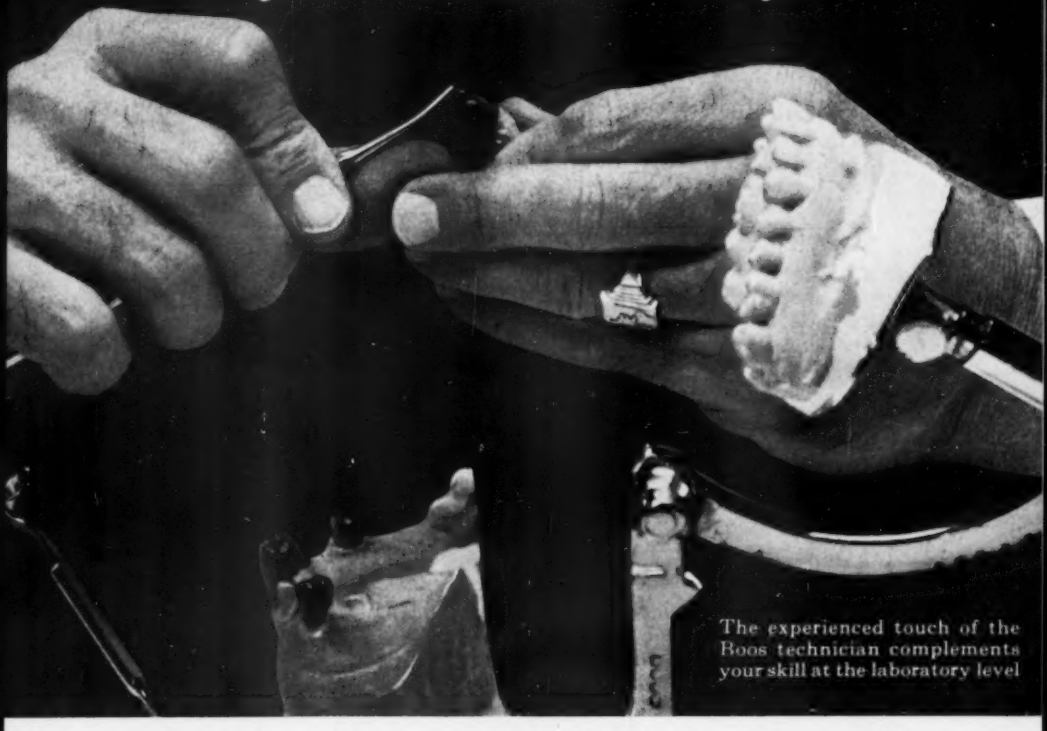

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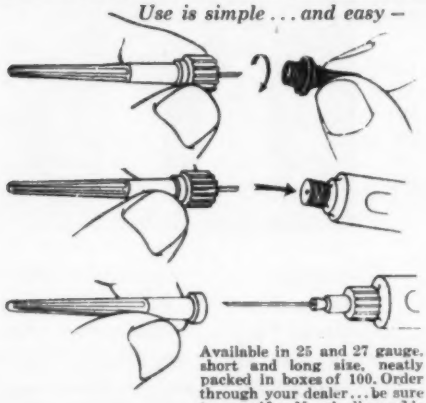

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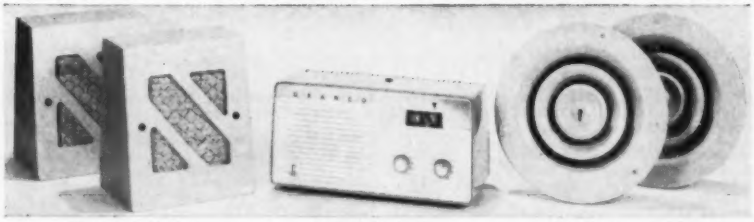

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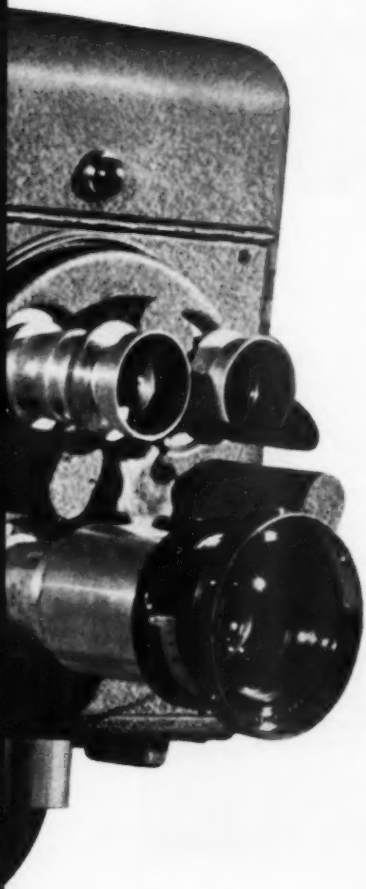

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A special videotape will be shown of cleft palate surgery by The Cleft Palate Team of The Children's Hospital, Philadelphia. During the surgical procedure, medical, dental, and speech specialists will discuss an integrated approach to cleft palate therapy.

A.D.A. Convention, Philadelphia Convention Hall Ballroom, October 17, 1961. Please check daily schedule.

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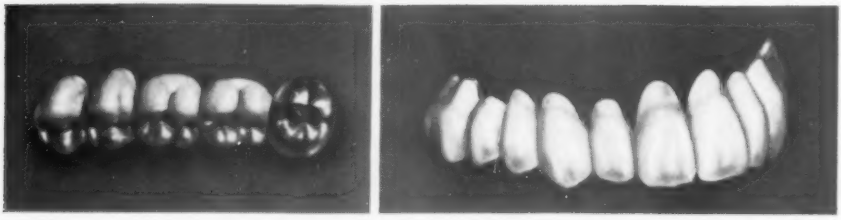

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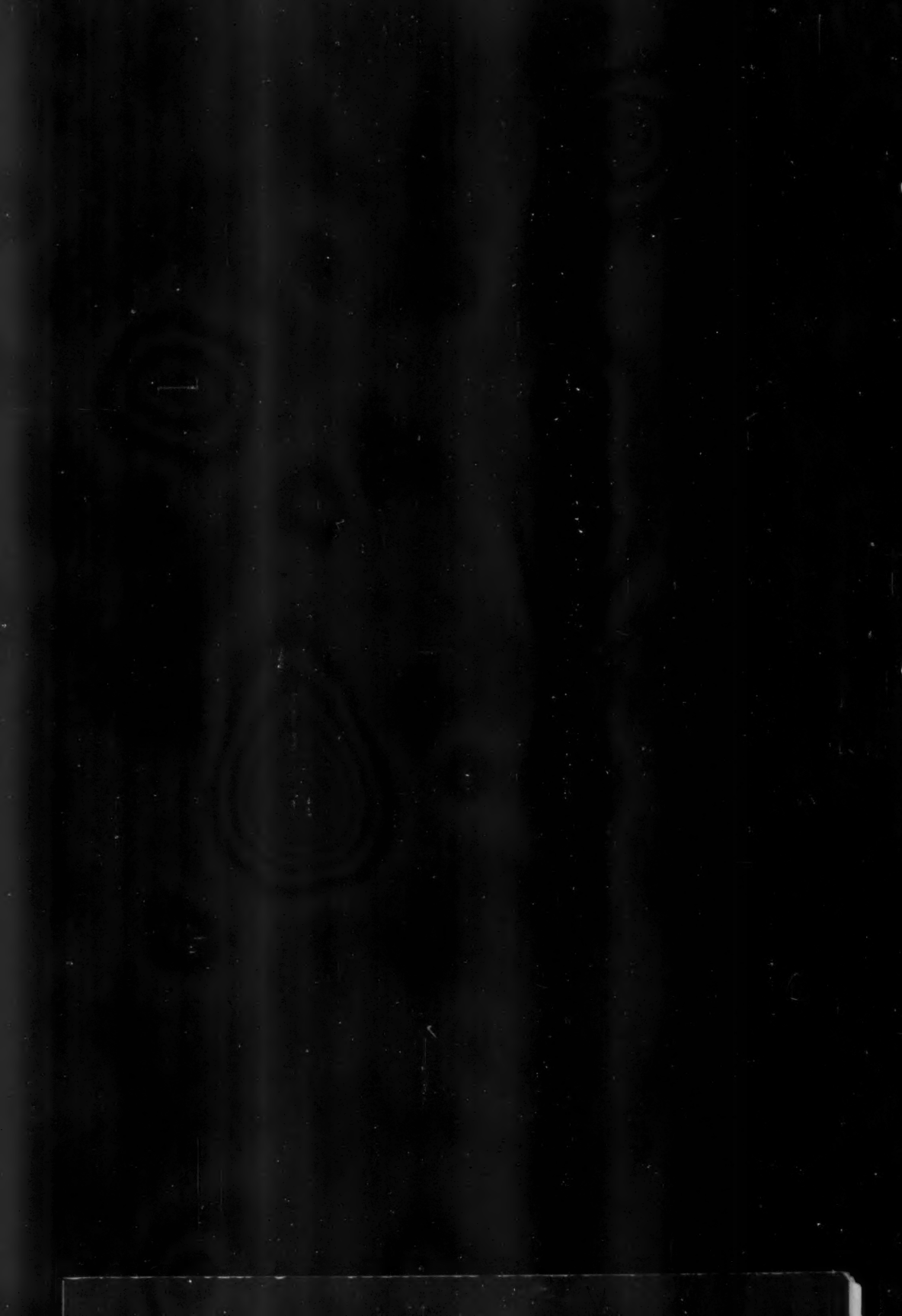
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